

THE

VETERINARY BULLETIN

Vol. 31]

November, 1961

[No. 11]

DISEASES CAUSED BY BACTERIA AND FUNGI

Vallejo, L. C., Nani, S., Frigerio, M. J. & Nota, N. A. (1961). Tipificación bacteriológica de cepas de *Staphylococcus aureus* aisladas de casos de mastitis bovina. Comunicación preliminar. [Phage typing of *Staph. aureus* isolated from bovine mastitis.]—Rev. Med. vet., B. Aires 42, 13-16. [Summaries in English and French.] **3458**

Of 19 strains of *Staph. aureus* isolated from cows with acute or chronic mastitis 15 were typable. Of these the majority were lysed by phages belonging to Group III and to Group III + 81.—T.E.G.R.

Tselishchev, L. I. (1961). [X-ray diagnosis of diseases of the bovine udder.]—Veterinariya, Moscow No. 6 pp. 54-57. [In Russian.] **3459**

For radiography 20-30 ml. of contrast medium (four media were described) were infused into each affected quarter. The method was used to determine the nature and extent of mastitis, and as a guide to the type of treatment required.—R.M.

Teute, H.-W. (1961). Praedisponierende Faktoren für das Auftreten von Mastitis und Untersuchungen über die Zusammensetzung von Mastitismilch. [Predisposing factors in mastitis and composition of mastitis milk.]—Berl. Münch. tierärztl. Wschr. 74, 185-189. [Summary in English.] **3460**

The role of hereditary predisposition, age, housing, environment and climate, milk yield, udder morphology, milking technique and diet on incidence of mastitis, was studied in two herds totalling about 250 cows. There was no apparent difference in the incidence of streptococcal mastitis in the four quarters of the udder. Staphylococcal mastitis appeared to occur more frequently in the two rear quarters. Staphylococcal mastitis affected all ages equally. A total of 22,945 milk samples

was collected: in 798 there was an increase in cells, 2,228 contained streptococci and 156 staphylococci. Mastitis milk differed considerably from normal milk, particularly in respect of fat, lactose, protein, chlorine, sodium, potassium and calcium content.—E.G.

Dineen, P. (1961). The in vivo production of penicillinase by hemolytic *Staphylococcus aureus*.—J. Immunol. 86, 496-504. [Author's summary modified.] **3461**

The production of staphylopenicillinase has been demonstrated in sterilized homogenate of mouse kidneys, placed in wells on agar plates seeded with *Sarcina lutea*. Activity was seen only in strains that were naturally penicillin resistant. It was not an adaptive enzyme, as it was present in the absence of penicillin exposure. Penicillinase was not present immediately after infection in mouse kidneys, it required time for production.

Wallmark, G. & Finland, M. (1961). Comparative activity of various penicillins against penicillinase-producing and nonpenicillinase-producing staphylococci.—Proc. Soc. exp. Biol., N.Y. 106, 78-85. [Authors' summary modified.] **3462**

Several penicillins were tested *in vitro* for activity against penicillinase-producing and non penicillinase-producing strains of *Staph. aureus*, with particular reference to the effect of the size of the inoculum. Marked differences were demonstrated, depending on type of penicillin, strain of staphylococcus and size of the inoculum.

I. Chiesa, F., Oberosler, R., Aguggini, G., Bergamaschi, M. & Perini, G. (1961). Di alcuni costituenti chimici nell'ultrafiltrato di latte vaccino normale e patologico. III. Gli aminoacidi liberi nell'ultrafiltrato di latte

proveniente da vacche affette da *Streptococcus agalactiae*. [Chemical composition of ultrafiltrates of normal and abnormal cows' milk. III. Amino acids in mastitis milk.]—Arch. Vet. Ital. 12, 135-143. [Summaries in English, French and German.] 3463

II. Oberosler, R., Aguggini, G., Bergamaschi, M., Chiesa, F. & Perini, G. (1961). Di alcuni costituenti chimici nell'ultrafiltrato di latte vaccino normale e patologico. IV. Comportamento delle frazioni fosforate nell'ultrafiltrato di latte proveniente da vacche affette da *Streptococcus agalactiae*. [Chemical composition of ultrafiltrates of normal and abnormal cows' milk. IV. Phosphorus in mastitis milk.]—Ibid. 145-148. [Summaries in English, French and German.] 3464

I. There were significant changes (increase or decrease) in concentration of free amino-acids (cystine, glycine, glutamic acid, alanine, tyrosine, methionine, leucine) in milk from cows with experimental or natural streptococcal mastitis, compared with values for normal cows. These changes occurred in diseased as well as in healthy quarters of affected cows and are considered to be due to metabolic disorders in mammary tissue and their occurrence in healthy quarters is ascribed to immune phenomena.

II. In cows with streptococcal mastitis there was a marked decrease (about 50%) in the inorganic phosphorus content of the ultrafiltrate of milk from affected and from sound quarters. It is considered that the metabolic disorders causing these changes also act on the sound quarters through immune factors.

—T.E.G.R.

Halbert, S. P. & Keatinge, S. L. (1961). The analysis of streptococcal infections. VI. Immunoelectrophoretic observations on extracellular antigens detectable with human antibodies. — J. exp. Med. 113, 1013-1028. [Authors' summary modified.] 3465

It was found by immunoelectrophoresis, that Group A streptococci release at least 20 distinct extracellular antigens in human tissues, as judged by naturally occurring antibodies in normal pooled human gamma globulin. Several of these precipitin arcs were identified with streptococcal antigens previously purified by electrophoresis and chromatography.

Human gamma globulin, as well as several rheumatic fever sera, were remarkably potent in antistreptococcal antibodies, when compared with four horse antibody concen-

trates obtained by hyperimmunization with streptococcal filtrates. A Group C streptococcal culture concentrate revealed 8 or 9 antigens for which corresponding antibodies were present in human gamma globulin.

Cooper, G. N. & Stuart, A. E. (1961). Non-specific immunity in pneumococcal infection of mice.—Nature, Lond. 191, 295-296. 3466

Considerable protection of mice against *Streptococcus pneumoniae* was afforded by lipopolysaccharide, and to a much lesser extent, by triolein, injected i/v 24 hours before challenge. The lipopolysaccharide appeared to stimulate some factor which caused more rapid death of the organisms following their removal from the blood. This may be either a serum factor (non-specific opsonin) or an enhanced intracellular activity of the phagocytes stimulated by the polysaccharide.—E.V.L.

Guercio, V. & Nobili, I. (1960). La liofilizzazione del vaccino alla saponina contro il carbonchio ematico. [Freeze-drying of saponin-treated anthrax vaccine.]—Atti Soc. Ital. Sci. vet. 14, 763-766. [Summaries in English and French.] 3467

The freeze-dried saponin-treated vaccine retained its efficacy for 12 months at room temperature or in cold storage; vaccine not freeze-dried lost some of its efficacy during the same period.—T.E.G.R.

Khundanov, L. E., Shkurko, E. D. & Devyatova, A. P. (1961). [Immune gamma globulin for prevention and treatment of experimental anthrax.]—Veterinariya, Moscow No. 6 pp. 45-46. [In Russian.] 3468

Concentrated gamma globulin was prepared from the serum of horses hyperimmunized either with the attenuated STI strain of anthrax bacillus or with a virulent strain. The gamma-globulin content of the concentrate ranged from 77 to 81%, beta-globulin 13-17% and albumin averaged 5%. Experiments on mice proved its superiority over hyperimmune serum.—R.M.

Thorsell, W. & Nordberg, B. K. (1961). Comparison of the haemolytic properties of *Bacillus cereus* and *Bacillus anthracis*.—Acta vet. scand. 2, 15-21. [In English. Summaries in German and Swedish.] 3469

Both *B. cereus* and *B. anthracis* lysed erythrocytes from rabbits, man, and cattle, but the haemolytic activity of *B. cereus* was consistently greater, and that of *B. anthracis*

on bovine erythrocytes was very slight. In mixtures of *B. anthracis* and rabbit or human erythrocyte stromata benzidine-positive and ninhydrin-positive substances which may be associated with the haemolytic process were demonstrated.—M.G.G.

Rudolph, W. (1961). Beitrag zur Diagnose der Pferdetuberkulose. [Diagnosis of tuberculosis in horses.] — Arch. exp. VetMed. 15, 7-11. 3470

The Middlebrook-Dubos haemagglutination test was found unsuitable for the diagnosis of TB. in horses, neither was a positive tuberculin skin reaction alone reliable proof of infection. When, however, the skin reaction was accompanied by increased temperature and general malaise, tuberculous lesions were always demonstrable P.M.—E.G.

Black, J. M. & Sutherland, I. B. (1961). Two incidents of tuberculous infection by milk from attested herds. Public health and clinical aspects. — Brit. med. J. June 17th, 1732-1735. 3471

A report of tuberculous infection among 100 children who had drunk raw milk from 2 attested dairy herds containing positive reactors. A cow in one herd had a tuberculous udder, and in the other a tuberculous cow had developed mastitis. It was suggested that dairy herds should be tuberculin tested at shorter intervals than a year or whenever any disease in the herd cannot be clearly diagnosed as being non-tuberculous.—M.G.G.

Anon. (1961). Erradicacion de la tuberculosis bovina en Venezuela. [Eradication of bovine tuberculosis in Venezuela.] — Rev. vet., venez. 10, 71-79. 3472

Eradication is based on slaughter of reactors and compensation. The intradermal tuberculin test is applied in the caudal fold or vulva (perianal mucosa in males). Herds with reactors are certified free after passing two further tests at an interval of not less than 60 days. Free herds are subsequently tested at least once a year; those in free zones are certified category "A" and those in infected zones category "B": The plan operated during 1954-1960 in certain areas comprising 500,000 (62.5%) of an estimated 800,000 dairy cattle population. In all, 1,070,196 tests were carried out with a total of 14,435 reactors, which were slaughtered. The incidence of reactors dropped from 3.46% in 1954 to 0.7% in 1960.—T.E.G.R.

Hogreve, F. & Lehmann, C. F. (1961). Betrachtungen zum Tuberkuloserückgang bei Rindern und Schweinen nach amtlichen Erhebungen am Schlachthof in Braunschweig und Oldenburg. [Reduction in the incidence of tuberculosis in cattle and pigs in Brunswick and Oldenburg.] — Tierärztl. Umsch. 16, 111-115, 152-154 & 202-206. 3473

The incidence of TB. in cattle (excluding calves) fell from 48% in 1949 to 10% in 1959 at the Brunswick abattoir, and from 10% in 1955 to 7% in 1959 in the Oldenburg abattoir. The incidence of TB. in slaughter pigs fell from 4.2% in 1949 to 0.9% in 1959 at Brunswick and from 1% in 1955 to 0.7% in 1959 at Oldenburg.—M.G.G.

D'Ascani, E. & Micozzi, G. (1961). L'idrazide dell'acido isonicotinico sola od associata alla diidrostreptomicina nella chemoprofilassi della tubercolosi. Influenza esercitata da questi due medicamenti nei riguardi della reazione tuberculinica. [Treatment of tuberculosis with isoniazid (alone or with dihydrostreptomycin); its effect on tuberculin reaction.] — Zooprofilassi 16, 7-24. [Summaries in English and French.] 3474

Isoniazid, alone or in combination with dihydrostreptomycin, diminished the reaction to tuberculin and in some tuberculous animals (infection confirmed P.M.) it completely inhibited reactions.—T.E.G.R.

Suntseva, T. S. (1961). [Recent advances in tuberculosis of fowls.] — Veterinariya, Moscow No. 6 pp. 48-52. [In Russian.] 3475

S. reviewed the following 11 papers on avian tuberculosis published during 1959 and 1960 as dissertations or in various publications of research institutes. Diagnosis and pathogenesis, by R. V. Tuzova; control in Kirgizia, by R. S. Polkovnikova and others; influence of external factors, by G. K. Boyadzhyan; role of calcium and vitamin D, by A. K. Anishchenko; electrophoresis of serum proteins, by K. Koichev & G. Grigrinov; control in Lithuania, by Y. P. Pechulis; transmission of infection by eggs, and diagnosis, by A. G. Yakovleva; biological methods of diagnosis, by O. Martma; pathology, by A. V. Akulov; egg transmission, by G. Grigorev & V. Kostev.—R.M.

Dordević, M. (1961). Statistička analiza učestalosti i lokalizacije nalaza tuberkuloze u pernate živine. [Statistical analysis of incidence and site of tuberculosis in poultry.]

—Vet. Glaz. 15, 395-399. [In Croat. Summary in German.] **3476**

P.M. findings in 2,801 poultry carcasses, examined during 1950-60 at the Belgrade Veterinary Faculty, revealed an annual incidence of TB. varying from 2-10%. In about 74% lesions were present in the liver, in 52% in the spleen, in 35% in digestive organs and in about 10% in the lungs.—E.G.

Wapler, P. (1961). Typenbestimmungen bei Tuberkelbakterien mit Hilfe der hohen Schicht. [Typing tubercle bacilli by the differential oxygen requirement method of Lebek.]—Inaug. Diss., Munich pp. 27. **3477**

According to Lebek (1958), tubercle bacilli of the human type grow near the surface of a tube of agar, while those of the bovine type grow at a lower level. All of 46 human type strains grew within 6 mm. of the surface; and 24 of 33 bovine type strains grew at a depth of 7-17 mm., but 9 of the bovine type grew at 5-6 mm. The depth of growth of 16 avian type strains was variable. It was concluded that the test is of some value for distinguishing tubercle bacilli of human and bovine types, but its results should be confirmed by other tests.—M.G.G.

Arima, J., Yamamoto, K. & Morikawa, K. (1960). Virulence des mycobactéries dites atypiques mesurée par la méthode de culture de tissu. [Evaluation of the virulence of atypical mycobacteria by the tissue culture method.]—C. R. Soc. Biol., Paris 154, 2404-2407. **3478**

Atypical mycobacteria were injected i/v into g.pigs, and 3 days later cultures were made of their spleen tissue. The degree of multiplication of the mycobacteria in the spleen tissue cultures was usually very low. It was considered that this test reveals the invasive power of mycobacteria in the initial stage of infection.—M.G.G.

Rice, C. E., Konst, H. & Carrière, J. (1961). Studies of Johne's disease in Canada. X. A more sensitive complement-fixation test.—Canad. J. comp. Med. 25, 121-128. [Authors' summary modified.] **3479**

The modified direct c.f. test is similar to the standard direct test except that a dilution of unheated bovine serum, or a globulin fraction of it, is added as a supplement to the g.pig complement. Higher titres were obtained with this supplemented test for sera from naturally infected cattle and reactivity

was detected 2-3 months earlier in experimentally infected animals.

Tamarin, R. & Landau, M. (1961). [Congenital and uterine infection with *Mycobacterium johnnei* in sheep.]—Refuah vet. 18, 22. In Hebrew. [In English. p. 44. English summary modified.] **3480**

The authors described a case of ovine foetal infection with *M. johnnei* and reported four instances of *M. johnnei* infection of the uterus in sheep. The possibility of congenital and uterine infection with paratuberculosis in sheep must not be lost sight of when measures for control of the disease are under consideration.

Palec, V. & Kazda, J. (1961). Nález Corynebacterium pyogenes v semení býků a výsledky jeho léčení. [Corynebacterium pyogenes in bull semen.]—Veterinářství 11, 213-214. [In Czech.] **3481**

The organism was isolated from the semen and preputial washings of 10 of 30 insemination bulls, which, although without clinical symptoms, had proved to be of low fertility. Nine of the bulls were treated with streptomycin-chlortetracycline ointment applied intrapreputially, after which fertility improved.—E.G.

Shanta, C. S. (1960). A note on the isolation of *Pf. whitmori* from the large intestines of a goat.—J. Malay. vet. med. Ass. 3, 35-36. [In English.] **3482**

Pfeifferella whitmori was isolated from ulcerative and haemorrhagic lesions of the large intestine of a goat that died from melioidosis.—M.G.G.

Miller, R., Jr. & Clinger, D. I. (1961). Melioidosis pathogenesis in rabbits. I. In vivo studies in the rabbit ear chamber. II. A simplified surgical technique for in vivo observations of pathologic changes in abdominal viscera.—Arch. Path. 71, 629-634 & 635-640. [Authors' summaries modified.] **3483**

The pathogenesis of melioidosis was studied in the rabbit ear chamber. Non-immunized and immunized animals were infected with a highly virulent strain of *Pseudomonas pseudomallei* [*Pfeifferella whitmori*]. Infection in the non-immunized animal was progressive, leading to complete destruction of the tissue in the chamber and death in 8 days. In the immunized animal the onset of pathological change was delayed, and histological sections at 60 days after infection showed focal and regressive lesions.

A surgical procedure was developed to permit observation of the viscera of living rabbits, by means of a transparent plastic window in the abdomen. The approximation of the overlying skin by a plastic zipper permitted daily observation of the abdominal contents without resort to further surgery.

Jowtscheff, E. (1961). Zur Anwendung des Thorntestes bei gesunden und rotlaufkranken Schweinen. [Thorn's test in healthy pigs and in pigs with swine erysipelas.]—Mh. VetMed. 16, 216-218.

3484

It was observed that in 15 healthy pigs the percentage of eosinophile leucocytes four hours after injection of adrenaline was considerably lower than before injection. This was not so in ten pigs with swine erysipelas. It was concluded that in swine erysipelas the r.e.s. is blocked by *E. rhusiopathiae*. [In the test described by Thorn (1948), a drop in the number of eosinophiles within four hours of injection of corticotrophin or adrenaline was regarded as proof of normal adrenal function.]—E.G.

Möhlmann, H., Maas, A. & Meese, M. (1961). Untersuchungen und Vorschläge zur Prüfung der Rotlauf-Adsorbat-Vakzine. [Methods for testing adsorbed swine erysipelas vaccine.]—Arch. exp. VetMed. 15, 150-182.

3485

Because of the absence of a definite relationship between the extent of skin reactions after infection by scarification and the efficiency of swine erysipelas vaccines it was recommended that for the testing of adsorbed swine erysipelas vaccines the scarification method should be abandoned in favour of conjunctival infection. Series of tests of vaccines for efficiency and duration of immunity, involving 261 pigs, were described in detail.—E.G.

Meese, M. (1961). Antigenstudien an Rotlaufbakterienstämmen der Variante B nach Taubenpassagen. [Antigenic studies with Group B variants of swine erysipelas bacillus after pigeon passages.]—Arch. exp. VetMed. 15, 89-99.

3486

Immunogenicity of formolized adsorbed vaccines prepared from Group B *E. rhusiopathiae* variant strains was not increased by pigeon passage of these strains. In 5 of 8 such strains potency was considerably reduced after 1-2 passages and disappeared completely with further passage. Live vaccines appeared to retain their protective power. By repeated pigeon passage it was possible to enrich

A-antigen in a B-group strain and demonstrate it by precipitation with acetic acid extracts but not with hydrochloric acid extracts. Virulence for pigs of A-antigen enriched strains was unchanged but mouse virulence was slightly increased.—E.G.

Goerttler, V. & Hubrig, T. (1960). Vergleichende Untersuchungen mit der Wachstumsprobe und dem Opsonozytophagentest zur Rotlaufimmunität der Schweine. [Growth-inhibition and opsono-phagocytic tests of immunity to swine erysipelas.]—Arch. exp. VetMed. 14, 1086-1096.

3487

Repeated tests during spontaneous swine erysipelas among 12 pigs, subsequently challenged with erysipelas bacilli, led the authors to conclude that the growth-inhibition test, as described by F. Heuner (1957) was a reliable guide to the immune status of a pig, but the opsono-phagocytic test was useless.

—R.M.

Sword, C. P. & Pickett, M. J. (1961). The isolation and characterization of bacteriophages from *Listeria monocytogenes*.—J. gen. Microbiol. 25, 241-248. [Authors' summary modified.]

3488

Lysogeny was investigated in 123 strains from human and animal sources throughout the world. Conventional procedures were unreliable with *Listeria* since lysogenic strains did not always, by spontaneous lysis, release a detectable amount of phage. However, after exposure to ultra-violet radiation, such strains were induced to produce up to 10^7 plaque-forming particles/ml. Some strains which did not release phage produced substances after irradiation possibly analogous to colicines. The lytic spectrum of 11 phages against 149 strains of *Listeria* was studied and a system of classification, with five of these phages, was used to place 127 of these strains in 8 phage types. Nearly all of the untypable strains were rough, undergoing dissociation, or were lysogenic. Phage susceptibility appeared to be closely associated with the serological type of the strain, but showed no relation to the animal source or the geographical origin. These studies indicated that *Listeria* phages could be used as a means of generic identification and also as a substitute for or an adjunct to serological typing in epidemiological investigations.

Shone, D. K. & Vickers, D. B. (1961). The isolation of *Pasteurella haemolytica* in Southern Rhodesia.—Bull. epiz. Dis. Afr. 9,

9-10. [Summary in French. Authors' summary modified.] 3489

The isolation and identification of *Past. haemolytica* from a case of bronchopneumonia in a sheep is described.

Dust to which the sheep were subjected is thought to have been the predisposing factor in the outbreak.

Mollaret, H. H. (1961). Contribution à l'étude de l'inoculation par voie oculaire de *Pasteurella pseudotuberculosis* (bacille de Malassez et Vignal). [Experimental *Pasteurella pseudotuberculosis* infection by the ocular route.]—Ann. Inst. Pasteur 100, 753-764. [Summary in English.] 3490

Infection of g.pigs with *Past. pseudotuberculosis* by conjunctival instillation or corneal scarification induced a local disease, followed by complete recovery. Injection into the anterior chamber caused panophthalmia and the loss of the eye. Sub-conjunctival injection caused generalized infection and death. Recovered g.pigs were mostly resistant to re-infection with *Past. pseudotuberculosis* or with *Past. pestis* by the ocular and i/p routes, but not by the s/c route. Conjunctival instillation of *Past. pseudotuberculosis* in rabbits had the same effect as in g.pigs, and of 7 cats infected by this route, 5 were unaffected and 2 showed conjunctivitis or tearing.—M.G.G.

Hubrig, T. & Köhler, W. (1961). Über eine neue, im Genitaltrakt von Bullen vorkommende serologische Gruppe 'h' bei *Pseudomonas aeruginosa*. [A new serological group 'h' of *Pseudomonas pyocyannea* from the genital system of bulls.]—Zuchthyg. Fortpfl. Störung. u. Besamung 5, 123-130. [Summaries in English and Russian.] 3491

From preputial washings, semen and testicles of 60 bulls, 95 strains of *Pseudomonas pyocyannea* were isolated, 63 of which differed serologically from those hitherto known and which could not be grouped by the precipitating sera available. They were classed as Group 'h'. From the prepuce or semen of ten of the bulls, several serologically different strains were isolated, and some precipitated with several group-specific sera. Only one of 50 non-groupable strains of human origin reacted with Group 'h' serum.

—E.G.

Renault, L., Guillon, J. C. & Palisse, M. (1961). *Escherichia coli* dans les affections respiratoires des oiseaux. [Coli bacilli in

respiratory diseases of fowls.]—Rec. Méd. vét. 137, 237-246. [Summaries in English and Spanish.] 3492

E. coli was isolated from 164 of 207 flocks with chronic respiratory disease. Of 64 strains from fowls with fibrinous lesions of the serous membranes, 30 caused identical lesions when injected i/p into chicks, as also did strains of *E. coli* isolated from new-born calves that had died from septicaemia. All of 153 strains of *E. coli* isolated from fowls were sensitive to neomycin, polymyxin and colimycin, and most to chloramphenicol, "Furadoïne" [a nitrofuran with the same active radical as furazolidone] and streptomycin, but none was sensitive to erythromycin. Of the 207 affected flocks, 50% were serologically negative for PPLO, as also were 50% of the fowls with fibrinous lesions. Infectious bronchitis was diagnosed in 21 of 110 flocks.—M.G.G.

Erlandson, A. L., Jr., Fisher, M. W., Gagliardi, L. A., Pearson, I. A. & Waisbren, B. A. (1961). Characteristics of strains of *Escherichia coli* associated with severe infections in adults.—J. infect. Dis. 108, 189-194. [Authors' summary modified.] 3493

Of 10 strains of *E. coli* isolated from severe extra-intestinal infections in human adults 9 were strikingly virulent for mice. All 10 strains were antigenically distinct from known enteropathogenic strains but exhibited some cross antigenicity between themselves. The characteristics of this mouse infection are described, and it was concluded that neither endotoxin nor direct immune depression played a significant role in the pathogenesis of these 10 strains in mice.

Spink, W. W. & Vick, J. A. (1961). Endotoxin shock and the coagulation mechanism: modification of shock with epsilon-aminocaproic acid.—Proc. Soc. exp. Biol., N.Y. 106, 242-247. 3494

In dogs, *Escherichia coli* endotoxin causes peripheral vascular collapse as a result of histamine liberation which may be related to the activation of a proteolytic system by the endotoxin. Pre-treatment with epsilon-aminocaproic acid (EACA), a potent inhibitor of plasminogen activator, protected the majority of animals against a lethal dose and protection was also observed when EACA was given 30 min. but not longer after the endotoxin. The infusion of EACA caused a significant rise in blood pressure but did not

prevent the immediate hypotensive action of the endotoxin. Although plasminogen activation may have been blocked, other proteolytic enzyme activity could have been involved.

—A. ACKROYD.

Röhr, W. (1961). Zur Infektion der Haustiere mit *S. paratyphi B.* [Infection of domestic animals with *S. paratyphi B.*]—Zbl. Bakt. I. (Orig.) 182, 276-278. 3495

At the Potsdam veterinary investigation centre, *Salmonella paratyphi B* was isolated from 2 cows, 2 calves and a pig between 1951 and 1960.—M.G.G.

Pumarola, A. & Diaz, L. (1961). Investigacion de germenes del grupo "Salmonella" en ligados de cerdos destinados al consumo. [Salmonella in the liver of slaughtered pigs.] — Rev. ibér. Parasit. 21, 73-80. [Summary in English.] 3496

Eight strains were isolated from 200 livers from pigs slaughtered at Salamanca. Three were *S. typhi-murium*, three were *muenchen*, one was *senftenberg* and one was *israel*.—R.M.

Huisman, J. (1961). Salmonella tel aviv op de mens overgebracht door een schildpad (Testudo graeca). [Salmonella tel aviv transmitted to man by a tortoise.]—Tijdschr. Diergeneesk. 86, 899-902. [In Dutch. Summaries in English, French, German and Spanish.] 3497

Acute febrile diarrhoea in a girl aged 14 years was associated with *Shigella sonnei*, staphylococci and *Salmonella tel aviv* in the faeces. The same salmonella was isolated from the girl's sister and brother-in-law and from the sister's tortoise that had died after a month's illness which terminated in bloodtinged diarrhoea. A number of the same shipment of tortoises from Casablanca had also died (cause not investigated).—R.M.

Manten, A., Kampelmacher, E. H. & Guinée, P. A. M. (1961). Frequency of resistance to chloramphenicol and tetracyclines among 12014 salmonella strains isolated in 1958 and 1959. — Antonie v. Leeuwenhoek J. Microbiol. 27, 103-109. 3498

An English translation of a paper previously published in Dutch [V.B. 30, 2467].—R.M.

Bischoff, J. (1961). Muss die Einfuhr von Känguruuhfleisch verboten werden? [Import of kangaroo meat: the danger of salmonella

infection.] — Arch. Lebensmittelhyg. 12, 175. 3499

Salmonella organisms were isolated from 57 of 106 samples of kangaroo meat imported in the deep-frozen state. The strains belonged to 17 serotypes of which the commonest were *chester*, *typhi-murium*, *adelaide*, *muenchen*, *welikada*, *bahrenfeld*, *bovis-morbificans* and *oranienburg*. New types were named *bahrenfeld*, *bergedorf* and *ohlstedt*. B. considered that import of this meat into Germany should be prohibited.

—R.M.

Galbraith, N. S., Archer, J. F. & Tee, G. H. (1961). Salmonella saint-paul infection in England and Wales in 1959. — J. Hyg., Camb. 59, 133-141. [Authors' summary.] 3500

An investigation of *Salm. saint-paul* infection in England and Wales in 1959 is described. In one-third of the human incidents the infection was attributed to home-produced meat coming from two infected abattoirs.

Infection in pigs and cattle was demonstrated and was probably due to contaminated imported animal feedingstuffs.

Quesada, A., Izzi, R. & Maggio, V. (1960). Sulla presenza di germi del genere *Salmonella* nelle farine di pesce impiegate per la confezione dei mangimi. [Salmonella in fish meal used in animal feeding stuffs.] — Atti Soc. ital. Sci. vet. 14, 757-762. [Summaries in French and German.] 3501

Fish meal imported into Italy from Angola was contaminated with *Salmonella binza*, which was pathogenic for chickens.

—T.E.G.R.

Rao, S. B. V. & Gupta, B. R. (1961). Isolation of *Salmonella weltevreden* and *Salmonella dublin* in an outbreak of salmonellosis in imported chicks. — Indian J. med. Res. 49, 6-8. 3502

Chicks imported from the U.S.A. were healthy during their first generation, but losses were experienced among chicks aged 6 days-3 weeks of the second generation. *S. weltevreden* was associated with arthritis of the tibiotarsal joints, nodular lesions on the heart wall and necrotic foci on the surface of the liver. Intestinal lesions were not always present. *S. dublin* was associated with sporadic deaths in adults. Both organisms were isolated from some birds.—R.M.

Gagliardi, G. & Carlotto, F. (1960). Salmonelle aviarie isolate nelle Venezie nel quadriennio 1956-1959. [Avian salmonella isolated in Venice during 1956-1959.] — Atti Soc. ital. Sci. vet. 14, 707-710. Discussion: p. 711. [Summaries in English and French.] 3503

Outbreaks of avian salmonellosis investigated amounted to 260 and six types were isolated: *S. typhi-murium*, *bareilly*, *senftenberg*, *cholerae-suis*, *anatum* and *enteritidis*; the first three were most frequent, *S. senftenberg* and *typhi-murium* being isolated from various species of birds.

—T.E.G.R.

Weidlich, N. & Niederehe, H. (1961). Über eine mit Erkrankungen beim Menschen zusammenhängende latente Salmonelleninfektion beim Geflügel. [Latent salmonellosis in poultry associated with human disease.] — Arch. Lebensmittelhyg. 12, 121-124. 3504

Following an outbreak of salmonellosis in personnel and patients of a hospital, *Salmonella muenchen*, *braenderup*, *oranienburg*, *blockley*, *pullorum*, *senftenberg* and *taksony* were isolated from faecal samples and carcasses of fowls from farms which had supplied the hospital with eggs during the critical period.—E.G.

Gulasekharem, J. & Cockburn, A. (1961). *Brucella abortus* (strain "Van der Schaff") isolated in Ceylon.—Indian J. med. Res. 49, 3-5. 3505

A strain isolated from the blood of a cow was similar to the strain isolated in Java by A. van der Schaaf (mis-spelt Schaff by the authors) [Ned-ind. Blad. Diergeneesk. 52, 1 (1941)]. It was agglutinated by *Br. abortus* monospecific serum. A similar strain was also isolated from a milk sample.—R.M.

Anon. (1961). Improved sampling procedure for brucellosis testing.—J. Amer. vet. med. Ass. 138, 247. 3506

Samples of milk for brucellosis testing are now taken from the milk used in butter-fat tests, eliminating the need for getting samples separately. Not only can samples be drawn from butter-fat test bottles faster, but also records are more accurate, dairy routine is not upset, and more flexible scheduling of tests is possible. Technicians need not revisit dairies to collect samples from dairymen who do not deliver milk every day, because each bottle from which the sample is drawn contains milk from several days' deliveries by the producer.

The substantial savings in time and labour have enabled many States to increase the frequency of tests from two to three times yearly.

Wiśniowski, J. (1961). Znaczenie właściwej interpretacji wyników badania serologicznego w zwalczaniu brucelozы u bydła. [Correct interpretation of results of serological tests for brucellosis in cattle.] — Med. Wet. Warszawa 17, 65-70. [In Polish.] 3507

A general discussion of serological tests for brucellosis in cattle and their interpretation.—M. GITTER.

Heuner, F. (1961). Probleme der Standardisation. I. Versuche zur Beeinflussung der bei der Standardisierung von *Brucella-abortus*-Testflüssigkeiten erzielten Einstellungsergebnisse mit Hilfe verschiedener Salze. [Problems of standardization. I. Influence of different salts on the standardization of *Br. abortus* diagnostic antigen.] — Zbl. VetMed. 8, 483-497. [Summaries in English, French and Spanish. English summary modified.] 3508

By adding various salts to brucella antigens it was possible to regulate permanently the sensitivity of the solution in relation to standard serum without changing its density. Copper and calcium salts raised the titre, while manganese and magnesium salts depressed it. It is the cations which exert a decisive effect. When a sufficiently large number of sera were tested, adding salt in standardized tests at the same density gave results that were inferior to those with the customary standardized tests at varying density. The possibilities of error caused by apparently unimportant variations in salt concentrations when standardizing brucella test reagents were demonstrated.

Schaetz, F., v. d. Aa, R., Busch, W. & Krüger, W. (1960). Vergleichende Untersuchungen über die Brauchbarkeit des Intrakutantestes zur Feststellung der Rinderbrucellose (unter Verwendung des Brucellin Dessau, Brucellin Berna und des Bangkutest Friesoythe). [Comparison of three brucellins for the intradermal test for bovine brucellosis.] — Arch. exp. VetMed. 14, 1228-1266. 3509

Skin tests were carried out in about 500 cattle from brucellosis-free herds and herds with either chronic or acute brucellosis using three brucellins: "Dessau" (a 1% soln. of non-agglutinogenic cell fractions of S strains of *Br. abortus*), "Berna" (a polysaccharide

fraction) and "Friesoythe" (a peptone-free haptan-like allergen, prepared from selected brucella strains). Results were compared with those of agglutination, c.f. and flocculation reactions and it was concluded that for the diagnosis of bovine brucellosis, the allergic skin test, using the above allergens, is unreliable and therefore inferior to the established serological tests.—E.G.

Bertschinger, H. U. (1961). Erfahrungen mit der holländischen Technik der Komplement-bindungsreaktion zur Diagnose der Rinderbrucellose. [The Dutch complement-fixation technique in brucellosis.] — Schweiz. Arch. Tierheilk. 103, 260-266. [Summaries in English, French and Italian.] 3510

In Switzerland, 2,154 serum samples from cattle were examined for brucellosis by the c.f. test, as modified by Hill in the Netherlands [V.B. 30, 2471]. Positive reactions were obtained in 7 of 235 cattle from non-infected herds, and in 177 of 251 from infected herds, which had yielded doubtful or positive agglutination reactions. Of 91 cattle, in which mammary brucellosis was demonstrated either serologically or by culture, 89 were positive to the modified test.—E.G.

Bienvenu, R. J., Jr., Rode, L. J. & Schuhardt, V. T. (1961). Microcolony brucellacidal test. — J. Bact. 81, 684-687. [Authors' summary modified.] 3511

A simple and accurate microcolony technique for brucellacidal antibodies is described. It was used to demonstrate that rabbit serum complement, after adsorption with *Brucella abortus*, does not reactivate the normal brucellacidal activity of heated rabbit serum. It was used also to demonstrate the reversal of the antibody excess zone of inhibition of brucellacidal activity by specific adsorption of antisera.

Meyn, A. & Schrinner, E. (1961). Zur Frage der Schutzimpfung gegen Rinderbrucellose mit Adsorbatimpfstoffen. II. Mitteilung. Schutzimpfversuche an 9-15 Monate alten Rindern. [Immunization of cattle against brucellosis with adsorbed vaccines. II. Experiments in cattle 9-15 months old.] — Rindertuberk. u. Brucellose 10, 75-82. 3512

Agglutination and c.f. titres persisted in the majority of 18 cattle (9 to 15 months old) which had been vaccinated twice at intervals of 3 months with 5 ml. of an adsorbed brucella vaccine, prepared by Lembke's method [V.B. 26, 3107]. In eleven there was

an increase of agglutination titre immediately after infection. Of the 18 vaccinated cattle, 13 calved normally, four of which were infected and nine non-infected births. [For Part I, see V.B. 30, 1711.]—E.G.

Allen, R. C. (1961). Studies on an immunogenic agent against *Brucella abortus*. II. Preliminary studies of an immunologically active soluble agglutinogen.—Amer. J. vet. Res. 22, 558-563. [Author's summary modified.] 3513

A soluble immunogenic antigen against experimental brucellosis in g.pigs was prepared from the cell-free culture filtrate of *Br. abortus* Strain 2308, grown in a buffered serum medium. The antigen also stimulated low, transient agglutinin titres in both g.pigs and rabbits. Data are presented which indicate that the antigen was liberated into the culture medium during the log.-death phase of growth. Further purification by continuous-flow electrophoresis indicated that the antigen migration was similar to that of gamma globulin. Acid-heat treatment of the material diminished, but did not completely destroy, the immunogenic activity.

Plescia, O. J., Noval, J. J., Palczuk, N. C. & Braun, W. (1961). Fractionation and immunological properties of a DNA-rich preparation from *Brucella abortus*. — Proc. Soc. exp. Biol., N.Y. 106, 748-752. [Authors' summary modified.] 3514

A deoxyribonucleic acid-rich preparation, obtained from *Br. abortus* by extraction with 0.5% phenol, was fractionated by differential ultra-centrifugation, and its immunological properties were studied. The antigens that precipitated antibodies from the sera of rabbits injected with the crude DNA preparation were concentrated in a fraction consisting essentially of DNA and only about 2% protein. This fraction did not elicit the formation of precipitating antibodies, whereas a protein-rich fraction with no reactive antigens did. Treatment of the reactive antigens with deoxyribonuclease altered some of their properties. It is suggested that the DNase-sensitive antigens are complexes containing DNA.

Braude, N. I. (1961). [Experimental study of brucella vaccines by using cortisone-treated mice.] — Veterinariya, Moscow No. 6 pp. 83-84. [In Russian.] 3515

Mice weighing 14-18 g. were injected i/m with 5 mg. cortisone. After 4 or 24 hours they were inoculated i/p with 500 million

organisms of the vaccine strain under test. When treated mice were inoculated with *Br. abortus* Strain 104-M (recommended by K. S. Kotlyarova for immunization of sheep and man) 83% died, some before the fourth day but most between the 4th and 7th days. When inoculated with *Br. abortus* Strain 19-BA, deaths did not commence until the fifth day and 45% died between then and the tenth day, when losses ceased. Cortisone reduced the resistance of mice, so that they could be used to compare the virulence of vaccine strains.

—R.M.

Parnas, J. & Burdzy, K. (1961). Untersuchungen über die protektive Rolle der Bakteriophagen bei einer Infektion mit *Brucella brucei*. [Protective role of bacteriophage in brucellosis.] — Z. ImmunForsch. 121, 125-129. **3516**

Five mice injected with brucella bacteriophage "24/II" 24 hours after s/c inj. of virulent *Br. abortus* did not die. Three of five injected with brucella alone died within a few days.—R.M.

Davydov, N. N. (1961). [Brucellosis in reindeer.] — Veterinariya, Moscow No. 5 pp. 48-51. [In Russian.] **3517**

Twelve reindeer were inoculated s/c with a reindeer strain of brucella and 12 with *Br. abortus*. Serological tests were done: the highest agglutinin titre obtained in apparently healthy reindeer was 1 : 16, so titres of 1 : 25 and above were judged positive. The animals were killed a month after infection for bacteriological and histological examination. The findings were compared with those in 20 spontaneously infected reindeer. Isolations were most frequently made from lymph nodes, spleen and gonads.

Clinical examination of 5,000 reindeer revealed 87 cases of bursitis, arthritis and orchitis, 85% of which reacted to serological tests. Three reindeer calves aged 3-5 or 4 months were housed for 38 days with experimentally infected female reindeer. Repeated serological tests on the calves during the subsequent four months were all negative and they showed no symptoms. It seemed that symptoms did not develop until after calving.

Strain 19 vaccine (2.5 or 5 ml.) was inoculated into 45 reindeer. In addition, 10 were inoculated simultaneously but at different sites on the body with Strain 19 and STI anthrax vaccine. Whereas 19 days later the agglutinin titres were between 1 : 800 and 1 : 3,200, by 3 months they had fallen to

1 : 40-1 : 320. By 6 months some animals were negative and most had titres of 1 : 20. Combined inoculation of anthrax vaccine did not influence agglutinin titres. At 2.5-3 and 4.5-6 months after immunization the animals were challenged by s/c injection of a reindeer strain of brucella in doses of 10,000 or 250 thousand organisms. (The lower dose caused generalized infection with necrotic lesions in lymph nodes and organs of non-immune animals.) They were killed a month after challenge, and no lesions were found in immunized animals, except enlargement of lymph nodes and organs in some, and generalized infection in one that also received anthrax vaccine. D. recommended the use of Strain 19 vaccine for reindeer.—R.M.

Nižnánsky, F., Nosál', M. & Velvart, J. (1960). Biologické vlastnosti brucelových kmeňov izolovaných v ČSSR. III. Čast. Zriedkavý prípad profesionálnej infekcie s izoláciou kmeňa *Brucella abortus*. [Properties of brucella strains isolated in Czechoslovakia. III. *Brucella abortus* infection in a veterinarian.] — Bratislavské lékařs. Listy 40, 156-161. [In Slovak. Summaries in English and Russian.] **3518**

A veterinary surgeon who for about a year had periodic bouts of malaise and temperature, developed a furuncle at the site of an injury, from the pus of which *Brucella abortus* was isolated.—E.G.

Dasinger, B. L. (1960). Glutamate metabolism and virulence in *Brucella abortus*.—Dissertation, Wisconsin pp. 82. [Abst. from Diss. Abstr. 21, 1331.] **3519**

Br. abortus strains of low virulence oxidize glutamate at a high rate whereas strains of high virulence oxidize glutamate at a low rate. Experiments were conducted to determine whether this difference could be related to the pathway of glutamate oxidation, quantitative differences in over-all oxidative activity, or limitations of permeability.—R.M.

Kamel, J., Abdel Ghaffar, S. & Tadros, M. M. (1960). Experimental investigation of the incidence of brucellosis among Cyrenaian and Egyptian goats.—J. Arab vet. med. Ass. 22, 281-283. [In English.] **3520**

Between 1947 and 1951, 288 (5.8%) of 4,618 Egyptian goats were positive to the tube agglutination test for brucellosis. None of 2,275 goats imported from Libya between 1952 and 1960 was positive.—M.G.G.

Kolb, E. & Seidel, H. (1960). Untersuchungen über den aeroben Stoffwechsel von *Brucella suis* unter besonderer Berücksichtigung der Oxydation von Kohlehydraten und Metaboliten des Trikarbonsäurezyklus. [Aerobic metabolism in *Brucella suis* with special reference to oxidation of carbohydrates and metabolites of the tricarboxylic acid cycle.] — Arch. exp. VetMed. 14, 1340-1350. 3521

The authors measured the respiration of cultures incubated at 37° and 45°C., before and after addition of various carbohydrates, acids and antibiotics.—R.M.

Ulbrich, F. & Wiegand, D. (1961). Zur Technik des kulturellen Nachweises von Brucellen im Blut. [Demonstration of *brucella* in blood by culture.] — Rindertuber. u. Brucellose 10, 59-68. 3522

Flasks of a capacity of 250 ml. containing 150 ml. of veal broth under vacuum, closed by a stopper with a small-bore needle, were steam-sterilized twice for 30 min. each time. Despite the small bore of the needle, blood flowed freely from the jugular vein because of the vacuum. About 100 ml. of blood were collected, and the flasks incubated at 37°C. for 14 days, after which amounts of 0.4 ml. were plated on Albimi or potato agar. The plates were incubated for one week in the presence of CO₂ and then examined. The method was stated to be superior to that described by Castaneda [V.B. 19, 845], the isolation in chick embryos or g.pigs, the plate culture method of Kuzdas & Morse [V.B. 25, 2306], the chick embryo method of Carrère & Roux (1954) and the blood medium method of Huddleson [V.B. 28, 1359].—E.G.

Reusse, U. (1961). Untersuchungen zur Reproduzierbarkeit der Katalase- und Ureaseprobe. [Reproducibility of the catalase and urease tests.] — Zbl. VetMed. 8, 341-352. [Summaries in English, French and Spanish. English summary modified.] 3523

The catalase activity of a *brucella* strain is directly proportional to the number of organisms, which means that for each suspension the catalase value can be interpolated in relation to a theoretical standard suspension. The results of catalase tests are reproducible, provided that bacterial counts are carried out very precisely using counting chambers. Because catalase activity in *brucella* is constant the catalase test can be used to identify strains. There is also a linear relationship between the duration of the reaction time and the height of catalase

activity. Thus the catalase values of different authors can be compared even if they have worked with different bacterial numbers and different reaction times. The urease test of Bauer also shows a direct proportion between bacterial numbers and urease activity but an interpolation of the results in terms of a theoretical standard suspension is not possible. This semi-quantitative method fails, therefore, to give exactly reproducible results.

Ferris, D. H., Hanson, L. E., Alberts, J. O., Calhoun, J. C. & Marlowe, R. (1961). Correlative serologic studies on brucellosis and leptospirosis in cattle and deer in Illinois. — Amer. J. publ. Hlth 51, 717-722. 3524

Blood samples were collected from 419 deer in Illinois. Of these only 243 were suitable for examination by the rapid plate test for brucellosis and the agglutination lysis test for leptospirosis. All were negative for brucellosis, but 10.2% yielded positive reactions with *L. pomona* antigen and 9.8% positive reactions with *L. grippo-typosa* antigen.—E.G.

Šebek, Z. (1960). Leptospiroseuntersuchungen beim Jagdwild. [Leptospira survey among wild animals in Czechoslovakia.] — Angew. Parasit. 1, 52-56 & 84-88. 3525

In a district where leptospirosis is endemic, 249 of 1,440 serum samples from rabbits, hares, musk rats, squirrels, weasels, martens, ermines, polecats, badgers, foxes, domestic cats, red-, roe- and fallow deer, muffs, and wild pigs were positive for leptospirosis. Of these 221 reacted with *L. grippo-typosa*, 11 with *sejroe*, 8 with *australis*, 3 with *icterohaemorrhagiae*, 3 with *bataviae*, 2 with *mitis* and 1 with *pomona*.

—E.G.

Schricker, R. L. & Hanson, L. E. (1961). Effect of cortisone on *Leptospira pomona* infection in the guinea pig. — Amer. J. vet. Res. 22, 580-586. [Authors' summary modified.] 3526

Cortisone given in 10- and 20-mg. doses for 18, 21, or 24 consecutive days, lowered the resistance of young g.pigs to *L. pomona* infection. The morbidity rate was greater in the cortisone-treated g.pigs as reflected in the lower weight gains, but death accompanied by icterus and fever, and by renal, hepatic, and vascular failure was not produced consistently. However, resistance was lowered sufficiently by cortisone to permit the leptospires to remain in the circulating blood 2 weeks longer

than in untreated infected g.pigs.

The prolonged use of cortisone apparently enabled the leptospires to re-enter the circulating blood 1 to 2 weeks after leptospire-negative blood samples had been obtained. The recurring leptospiraemia took place in spite of agglutination-lysis serum titres as high as 10^5 . Cortisone did not significantly interfere with the formation of agglutination-lysis serum titres.

In another experiment, cortisone and *L. pomona* activated a latent *Salmonella enteritidis* infection, causing septicaemia and high mortality. Neither cortisone nor the leptospiral infection alone activated the salmonella infection.

Cacchione, R. A., Bulgini, M. J., Martinez, E. S. & Caselli, E. S. (1960). Leptospirosis experimental. Efectos de las leptospiras sobre la coagulación sanguínea en cobayos. [Effects of leptospira infection on blood coagulation in guinea-pigs.]—Rev. Invest. Ganad. No. 9 pp. 135-147. [Summaries in English and French.] **3527**

The blood clotting time and the prothrombin time increased in g.pigs infected with *L. icterohaemorrhagiae* but returned to normal after s/c injection of vitamin K. Other effects of the infection were reduced platelet count, anaemia, slight leucocytosis and slight changes in the leucocyte picture.

—M.G.G.

Mumford, D. H. (1961). Enterotoxaemia in cattle.—Aust. vet. J. 37, 122-126. [Author's summary modified.] **3528**

Enterotoxaemia has been diagnosed as a cause of mortality in New South Wales affecting cattle of all ages. *Cl. welchii* Type D appears to be primarily responsible. Symptoms and P.M. findings are described.

Laboratory tests are detailed and difficulties in confirming diagnosis are discussed.

Dehmel, H. (1961). Der Bindungstest als Wertbestimmungsmethode für Tetanusantigen. [Neutralization test for assaying tetanus antigen.] — Arch. exp. VetMed. 15, 146-149. **3529**

Details were given of a neutralization test in mice for assaying tetanus antigen, using standard tetanus serum, diluted to contain one unit of antitoxin per ml. To amounts of 2 ml. of such a dilution reducing amounts of the antigen to be tested, together with saline to make 3 ml. of final mixture, were added.

After 2 hours at room temp. 1 ml. of standard toxin soln. was added. Control mixtures without test antigen were also prepared. Mice were injected in the inguinal region with 0.4 ml. of each mixture. The method was suitable for evaluation of the antigenic value of native toxin and formalized toxoid and for the demonstration of incomplete adsorption of antigen in vaccines.—E.G.

Hoppe, R., Ryniewicz, Z., Markowski, A. & Skowroński, Z. (1961). Beobachtungen über die Behandlung Vibriosis-kranker Bullen. [Treatment of vibriosis in bulls.]—Zuchthyg. FortpflStörung. u. Besamung 5, 159-168. [Summaries in English and Russian.] **3530**

Vibriosis was cured in two bulls by washing the anaesthetized penis and prepuce with 0.5% chloramine soln., followed by massage for 15 min. with an ointment containing procaine penicillin, streptomycin, oxytetracycline and chloramphenicol in liquid paraffin. A third bull failed to respond to repeated treatment with an ointment consisting of streptomycin and oxytetracycline in glycerine, accompanied by i/m doses of 6 g. of streptomycin. This bull was eventually cured by intraperitoneal infusion on three successive days of 10 ml. of "Reverin" [pyrrolidino-methyl tetracycline], accompanied by i/m doses of 40 ml. of this drug. This treatment was equally successful in another seven infected bulls.—E.G.

Te Punga, W. A. & Moyle, G. G. (1961). An indirect haemagglutination test for the detection of *Vibrio fetus* antibodies. Part 4. Non-specific reactivity of bovine serum.—N.Z. vet. J. 9, 41-43. [Authors' summary.] **3531**

Sera from cattle over the age of 15 months show non-specific reactions in the indirect haemagglutination test. It is suggested that this reactivity is due to an antibody-like protein.

Results of tests for vibriosis on cattle sera must be interpreted with caution.

Quesada, A., Monda, V. & Lombardi, D. (1960). Su di un grave episodio di epatite nodulare necrotica degli agnelli. [Outbreak of nodular necrotic hepatitis in lambs.]—Atti Soc. ital. Sci. vet. 14, 750-757. [Summaries in French and German.] **3532**

An account of necrotic hepatitis caused by *Fusiformis necrophorus* in lambs aged 15-20 days.—T.E.G.R.

Ellis, E. M. (1961). The recovery of *Bacterium anitratum* (B5w) from animals.—Amer. J.

vet. Res. 22, 610-613. [Author's summary modified.] 3533

A Gram-negative bipolar rod isolated from chickens and a calf was classified biochemically as *Bacterium anitratum* (B5w). At P.M. examination the calf had signs of snake bite or clostridium infection. Intra-peritoneal inoculation of one isolate (strain 2409) killed g.pigs and mice.

The 3 strains isolated differed only in their haemolytic activity on 5% ox blood agar and the ability of 1 strain (2409) to ferment lactose in 7 days. Slight differences were noted in ability to use oxygen. There were indications that the organism was pathogenic.

Miya, F., Marcus, S. & Perkins, E. H. (1961).

Cellular factors in resistance to acute bacterial infection. — J. Immunol. 86, 526-532. [Authors' summary modified.] 3534

Both *in vitro* and *in vivo* studies are reported. Changes in oxygen uptake recorded by the Warburg apparatus could be correlated with the death or proliferation of the organisms ingested by normal or "immune" phagocytes.

Phagocytes from animals actively immunized against acute bacterial infections had enhanced functional capacity independent of demonstrable antibody. This enhanced activity may play a dominant role in host defence in cases where antibacterial resistance cannot be correlated with antibody titres.

Kampschmidt, R. F. & Schultz, G. A. (1961). **Hypoferremia in rats following injection of bacterial endotoxin.** — Proc. Soc. exp. Biol., N.Y. 106, 870-871. [Authors' summary modified.] 3535

A single injection of as little as 0.1 µg. of lipopolysaccharide from bacteria produced marked hypoferraemia in the rat. Tolerance developed with daily administration of the endotoxin.

Borodulina, N. A. (1960). [Pathological changes in young calves: brain lesions in acute paratyphoid, colibacillosis and diplococcal infection.] — Trudy Saratov. zootekh.-vet. Inst. 9, 167-170. [In Russian.] 3536

Whereas in acute paratyphoid there was diffuse meningoencephalitis with pronounced proliferation of vascular endothelium, in *E. coli* and *Str. pneumoniae* infections the encephalitis was serous with proliferation of glial elements in the subependymal layer of the white matter. Vitamin A deficiency involved the intramural ganglia of intestine

and the convoluted tubules of the kidney. —R.M.

Cluzel, R., Michel, J., Vaurs, R. & Cluzel-Nigay, M. (1961). Étude comparée de l'effet bactéricide des associations d'antibiotiques à base de colistine sur les Entérobactériacées et Pseudomonadacées. [Bactericidal action of antibiotics combined with colistin on *E. coli*, *S. paratyphi B*, *Ps. pyocyanne* and other bacteria.] — Ann. Inst. Pasteur 101, 203-210. [Summary in English.] 3537

In experiments with cultures of various organisms of the Enterobacteriaceae group, synergy occurred when chloramphenicol or chlortetracycline was combined with colistin.

—R.M.

Michael, J. G., Whitby, J. L. & Landy, M. (1961). Increase in specific bactericidal antibodies after administration of endotoxin. — Nature, Lond. 191, 296-297. 3538

The authors found that after administration of endotoxin to mice, in amounts which elicit so-called non-specific immunity, there was an increase in serum bactericidal activity against several antigenetically unrelated strains of Gram-negative bacteria. This was assumed to be due to a transitory effect of the endotoxin on antibody-forming cells, involving either release of preformed antibodies or a temporary increase in the capacity of these cells to produce antibody. —E.V.L.

+ Ceccarelli, A. (1961). Qualche ricerca su di un focolaio di mastite da *Candida tropicalis* nel bovino. [Outbreak of *Candida tropicalis* mastitis in cows following treatment with oxytetracycline.] — Zooprofilassi 16, 95-102. [Summaries in English and French.] 3539

Oxytetracycline solution was infused for prophylactic purposes into the udders of 23 healthy cows in a herd of 250. The dosage was 125 mg. a quarter. Within 15 days all 23 cows developed severe mastitis. A fungus was present in all samples examined and it was identified as *C. tropicalis* by the Pasteur Institute. —R.M.

- Jellison, W. L., Vinson, J. W. & Borg, K. (1961). **Adiaspiromycosis (haplomycosis) in Sweden.** — Acta vet. scand. 2, 178-184. [In English. Summaries in German and Swedish. Abst. from authors' summary.] 3540

The authors reported five additional cases of *Haplosporangium parvum* infection among wild animals [see also V.B. 30, 3859]. In an otter (*Lutra lutra*) severe pulmonary lesions were considered to be the cause of death.

✓ Straub, M., Schwarz, J. & Fattal, A. R. (1961). **Spontaneous canine histoplasmosis. Mycology and morphology.**—Arch. Path. 71, 685-692. [Authors' summary modified.] 3541

Of 78 dogs from Cincinnati, healed primary histoplasmosis was found in 14, subacute histoplasmosis in 5, and positive lymph node cultures in 26. The total number of mycologically and/or anatomically positive cases was 32. The c.f. test in 6 positive cases was 1/16 or more. In 9 animals with positive lymph node cultures, small pulmonary lesions were regarded as primary foci in a pre-necrotizing phase; these are described. In 9 morphologically inactive cases, positive lymph node cultures of strains virulent for hamsters were obtained.

✓ English, M. P. (1961). **An outbreak of equine ringworm due to *Trichophyton equinum*.**—Vet. Rec. 73, 578-579 & 580. [Author's summary modified.] 3542

An outbreak of equine ringworm due to *Trichophyton equinum* is described. Eighteen of 19 stabled animals contracted the disease, as did 3 horses at grass. Four of the 7 people who were at risk were also infected. Some aspects of the epidemiology are discussed.

De Keyser, J. & Cotteleer, C. (1961). Haaruitval bij twee chinchilla's veroorzaakt door Ctenomyces mentagrophytes (Robin-Blanchard). [**Loss of fur in two chinchillas caused by *Trichophyton mentagrophytes*.**]—Vlaams diergenootsch. Tijdschr. 30, 177-181. [In Flemish. Summaries in English, French and German.] 3543

The fungus was isolated by placing affected hairs on a medium composed of glucose, peptone and agar. The animals were provided with a sand bath containing one part iodochlorhydroxyquinoline (Vioform) to ten of sand, and after a fortnight the hair began to grow on the bald patches.—R.M.

✓ Pier, A. C., Mejia, M. J. & Willers, E. H. (1961). ***Nocardia asteroides* as a mammary pathogen of cattle. I. The disease in cattle and the comparative virulence of 5 isolates.**—Amer. J. vet. Res. 22, 502-517. [Authors' summary modified.] 3544

Nocardia asteroides was demonstrated in severe mastitis in 7 dairy herds in California and 3 in Hawaii. The organisms had constant mycological features but varied in virulence for g.pigs. The clinical disease usually closely followed calving; it varied in severity, which corresponded to the virulence of the isolates

for g.pigs.

The more severe form of the disease was denoted by high body temperature and a rapidly progressive fibrosis of the udder, often accompanied by the development of sinuses or rupture of the udder. Granulomatous lesions were seen in the udders. Spread of infection to the lungs and supramammary lymph nodes was observed. The less severe form of the disease usually led to progressive fibrosis of the infected quarters.

The clinical syndrome and the lesions seen in field cases were reproduced by experimental inoculations.

✓ Schleiter, H. & Federwisch, G. (1961). Die Wirtschaftlichkeit der Aktinomykose-Operation. [**Economics of surgical treatment of actinomycosis in cattle.**]—Berl. Münch. tierärztl. Wschr. 74, 170-172. [Summary in English.] 3545

Surgical treatment of actinomycosis, combined with antibiotic, sulphonamide or iodine therapy, was successful in 125 of 206 cattle treated during 1957/58 at Leipzig. In about 25% there was recurrence of the disease.—E.G.

Hebeler, H. F., Linton, A. H. & Osborne, A. D. (1961). **Atypical actinobacillosis in a dairy herd.**—Vet. Rec. 73, 517-521. 3546

An outbreak of actinobacillosis with a morbidity of 7% occurred in a herd of 160 cattle between December and March. The animals were in poor condition on account of the previous dry summer. There was a high incidence of lesions of the skin and related lymph nodes in the 11 affected animals. Mouth lesions involved the gum, but in one case the dental pad and right external nares. In no case was the tongue affected. Pus yielded *Actinobacillus lignieresii*. One animal was slaughtered, the remainder recovered with or without treatment with antibiotics and iodine. P.M., histological and serological findings were recorded.—M.G.G.

Menascé, I., Barmoscé, B. & Foltin, E. (1961). Ricerche sulla actinobacillosi bovina. I. Riproduzione sperimentale della malattia e reattività alla tubercolina. [**Experimental actinobacillosis in cattle; reactivity to tuberculin.**]—Zootrofie 16, 165-173. 3547

Experimental infection with *Actinobacillus lignieresii* was achieved in 19 cattle by injection of a suspension into the tongue, s/c in the submaxillary gland region, or into prescapular lymph node. Repeated tests with

PPD tuberculin were always negative even in animals which had, in addition, been inoculated with a saprophytic acid-resistant mycobacterium.—T.E.G.R.

Spesivtseva, N. A. & Kurasova, V. V. (1961). [Demonstration of pathogenic fungi in tissues of animals.]—Veterinariya, Moscow No. 6 pp. 85-86. [In Russian.] 3548

After hydrolysis in 4% chromic acid for an hour, sections of tissues were stained by Schiff's reagent (method of Hotchkiss & McManus).—R.M.

Bonner, R. D. & Fergus, C. L. (1959). The fungus flora of cattle feeds.—Mycologia 51, 855-863. 3549

This paper is based on a dissertation presented by the senior author in 1958 [see V.B. 29, 2397]. It lists 64 species of fungi isolated from 26 samples of silage, dried forage and dried grain.—M.G.G.

Bridges, C. H. & Emmons, C. W. (1961). A phycomycosis of horses caused by *Hyphomyces destruens*.—J. Amer. vet. med. Ass. 138, 579-589. 3550

A fungus was isolated from 8 of 23 granulomatous skin lesions. The fungus has not been fully identified, but the authors provisionally named it *Hyphomyces destruens*. No nematode larvae were found in the lesions, which were characterized by proliferative inflammation of the skin and mucous membranes. Within the granulation tissue were necrotic masses of tissue containing numerous branching, occasionally septate hyphae. Neutrophiles and eosinophiles were numerous throughout the necrotic masses and surrounding granulation tissue. The disease was chronic and progressive, and surgical intervention appeared to be the only method of treatment. Infection appeared to have followed cuts of the skin.—M.G.G.

Matushevich, V. F. (1961). [Role of pH of rumen contents in the development of stachybotryotoxicosis in cows.]—Veterinariya, Moscow No. 4 pp. 49-50. [In Russian.] 3551

There was a high incidence of stachybotryotoxicosis in cows fed large quantities of sugar-beet pulp and sour silage. *Stachybotrys alternans* was isolated from 83 of 93 samples of straw, soil from beneath ricks, rumen contents, and cows' faeces, but not from 24 samples of maize silage and hay. The pH of the rumen contents of most cows on affected farms had fallen to 6.9-6.4. Blood

changes indicative of acidosis and toxicosis were found.—M.G.G.

Spesivtseva, N. A. (1960). [Mycoses and mycotoxicoses of animals.] pp. 453. Moscow: Gosud. izdatel'stvo sel'skokhoz. literatury. [In Russian.] 3552

This Russian textbook was written for veterinary surgeons and it covers mycoses, mycotoxicoses and methods of diagnosis. The toxicoses comprise *Claviceps*, *Stachybotrys*, *Dendrodochium*, *Aspergillus* and *Fusarium* poisonings. The chapter on aspergillotoxicosis contains original information on the toxicity to pigs, cattle, horses and lab. animals of *flavus*, *niger*, *versicolor*, *ochraceus* and *fumigatus*, either as cultures or in foodstuffs and there are colour plates of the different species growing on Czapek's agar. Twenty-nine pages are devoted to examinations of foodstuffs for fungi or their toxins.

The usual mycoses are dealt with, with the addition of chapters on bovine mucormycosis, and mycotic abortion. Most chapters give details of history, geographical distribution, pathogenicity, pathogenesis, epidemiology, symptoms, diagnosis and treatment or control. The bibliography contains 14 pages of Russian and 14 of non-Russian references. There is an index of Latin names, but no subject index. The book was published in July 1960 but it has not yet been placed on sale in the United Kingdom.—R.M.

Rodwell, A. W. & Abbot, A. (1961). The function of glycerol, cholesterol and long-chain fatty acids in the nutrition of *Mycoplasma mycoides*.—J. gen. Microbiol. 25, 201-214. [Authors' summary modified.] 3553

Mycoplasma mycoides var. *mycoides* requires for growth a number of preformed lipid precursors. Media containing glycerol, cholesterol, a saturated and an unsaturated fatty acid, defatted bovine serum albumin and an additional defatted serum protein fraction (Fraction C) can supply these requirements. Albumin is believed to function by binding fatty acids, and Fraction C by binding cholesterol. The requirement for a saturated fatty acid can be satisfied by myristic, palmitic, stearic or margaric acid, lauric acid being less effective. The requirement for an unsaturated fatty acid can be satisfied by oleic acid, linoleic and linolenic acids being less effective. Organisms incubated in a medium deficient in either glycerol, the Fraction C + cholesterol system, or oleate, but adequate in

all other nutrients, died rapidly. Death was accompanied by lysis. Death due to a deficiency of glycerol or of cholesterol was prevented either by the omission of uracil (an essential nutrient) or by addition of chloramphenicol. Death due to oleate deficiency was not prevented by the omission of uracil. Morphological changes which resulted from each of these deficiencies are illustrated by electron micrographs. The hypothesis is advanced that glycerol, cholesterol and long-chain fatty acids are all needed for the synthesis of an undetermined cell component which is necessary for the structural integrity of the cell, and that the synthesis of this is more sensitive to a deficiency of these nutrients than is the synthesis of cytoplasm.

Aftosmis, J. G., Tourtellotte, M. E. & Jacobs, R. E. (1960). **A sensitive whole blood test for *Mycoplasma gallisepticum*.** — Avian Diseases 4, 485-491. **3554**

Antigen for the whole-blood plate test for chronic respiratory disease of fowls was pre-

See also absts. 3711 (U.N. report to the Government of Paraguay on livestock diseases control); 3820 (report, Agricultural Research Council); 3820 (report, Animal Health Trust); 3822 (report, Republic of Ireland); 3823 (report, Netherlands); 3826 (book, bacteriology).

DISEASES CAUSED BY PROTOZOAN PARASITES

Stephen, L. E. & Gray, A. R. (1961). **Observations on the therapeutic activity of metamidium, tozocide and nucleocidin against *Trypanosoma simiae* infections in pigs.** — Vet. Rec. 73, 563-566 & 567. [Authors' summary modified.] **3556**

In tests for therapeutic activity of metamidium chloride, tozocide chloride and the antibiotic nucleocidin, against fly-transmitted *T. simiae* infections in pigs, none of these drugs was curative at the doses employed.

Metamidium chloride at 3.0 mg. per kg. cleared trypanosomes from the peripheral blood for 5, 7 and 21 days, and at 6.0 mg. per kg. cleared the blood for 15, 25 and 32 days. The relapse infections killed 2 of the 3 pigs in each group.

Tozocide chloride at 4.0 mg. per kg. and nucleocidin at 0.05 mg. per kg. had little effect on the course of the infections. All the pigs died within 17 days of being treated.

Chernov, V. S. (1961). **[Eradication of trichomoniasis in cows.]** — Veterinariya, Moscow No. 4 pp. 43-44. [In Russian.] **3557**

Cows with trichomoniasis were given two 7-day courses of treatment, 5-6 days apart, consisting of s/c injection of 2 ml. of 0.5%

pared from saline suspension of concentrated PPLO stained with crystal violet. The results, which were read three minutes after mixing blood with antigen, were clearer than tests in which the antigen described by Jacobs and others [V.B. 25, 56] was used.—R.M.

Crosby, W. H. & Benjamin, N. R. (1961). **Frozen spleen reimplanted and challenged with *bartonella*.** — Amer. J. Path. 39, 119-127. [Authors' summary modified.] **3555**

Autogenous splenic tissue from rats which had been frozen, thawed, and replaced in the peritoneal cavity remained capable of implanting itself beneath the serosa. The reconstituted splenculi had a microscopic structure closely resembling that of a normal spleen.

Splenectomized rats with implanted splenculi were inoculated with *Haemobartonella muris*, and all promptly died of anaemia. In a control group of animals with intact spleens, all except one survived.

neostigmine soln. or 1% hexoestrol soln. on the first day, daily irrigation of the vagina and uterus with 0.1% iodine-iodide soln. and introduction of iodine tincture into the uterus up to the fifth day, irrigation of the vagina and uterus with 10% ichthyl soln. on the 6th day and with 10% saline soln. on the 7th day. Tissue preparation was injected s/c on the 2nd and 7th day. Up to 80% were cured.

—M.G.G.

Gualandi, G. L. & Zanella, A. (1961). **Coltura ed isolamento di *Trichomonas suis*, *Trichomonas gallinarum* e *Histomonas meleagrididis* dal contenuto intestinale. [Isolation of *Trichomonas suis*, *Trichomonas gallinarum* and *Histomonas meleagrididis* from intestinal contents.]** — Vet. ital. 12, 95-99. [Summaries in English, French and German.] **3558**

All the strains of *Trichomonas suis* and *gallinarum* and of *Histomonas meleagrididis*, isolated from the intestinal contents of the affected species, grew well on the medium described in a previous paper [V.B. 31, 375]. Ox serum added to the medium enhanced the growth of *Tr. foetus* and *suis* and horse or fowl serum enhanced that of *Tr. gallinarum* and *H. meleagrididis*. —T.E.G.R.

Tadros, G. (1960). *Eimeria debbiecki* Douwes, 1921. A newly recorded parasite of swine in the Egyptian Region U.A.R.—J. Arab vet. med. Ass. 22, 259-263. 3559

E. debbiecki was found in the colon and caecum of 7 of 100 pigs in the Alexandria abattoir. In 2 it also occurred in the jejunum. Slight hyperaemia was observed in infected colons. The caecum and jejunum were macroscopically normal.—M.G.G.

Ellis, P. A. & Wright, A. E. (1961). Coccidiosis in guinea-pigs.—J. clin. Path. 14, 394-396. [Authors' synopsis modified.] 3560

The purchase of a number of guinea-pigs infected with *Eimeria caviae* was followed by 12 deaths when these animals were injected with material for diagnostic purposes. No deaths occurred in the laboratory stock herd, as these were kept separate from the newcomers and were not infected. The life history of the parasite is described, together with the P.M. findings.

Dorn, P. & Sommerer, M. (1961). Die Therapie der Dünndarmkokzidiose im Feldversuch. [Treatment of intestinal coccidiosis in fowls.] —Mh. Tierheilk. 13, 63-69. 3561

In chickens about seven weeks old from infected flocks, sulphadimidine and sulphquinoxaline were superior to sodium salt of *p*-toluol sulphonyl- β -methoxy ethyl urethane and nitrofurazone. All drugs were given in the drinking water. Drug control should always be combined with hygienic measures.

—E.G.

Beye, H. K., Getz, M. E., Coatney, G. R., Elder, H. A. & Eyles, D. E. (1961). Simian malaria in man.—Amer. J. trop. Med. Hyg. 11, 311-316. 3562

The monkey parasite *Plasmodium cynomolgi bastianelli* caused malaria (milder than *Pl. vivax* infection) in 16 of 20 human beings experimentally infected by mosquitoes.

—R.M.

Vaccari, I., Ballarini, G. & Pieresca, G. (1961). Theileriasi delle lepri—"corpi di Koch" in *Lepus europaeus* Pall. [Theileria infection in a hare.] —Nuova Vet. 37, 59-66. [Summaries in English, French, German and Spanish.] 3563

A case report. Koch's blue bodies were demonstrable.—T.E.G.R.

Radkevich, P. E. (1961). [Specific and symptomatic therapy in Theileria annulata infection

in cattle.]—Veterinariya, Moscow No. 5 pp. 26-28. [In Russian.] 3564

R. modified his three-day course of treatment [V.B. 31, 708] by giving on the third day a s/c injection of quinuronium at 0.5 mg./kg. in the morning and an i/m injection of oxytetracycline at 3 mg./kg. in the evening. In addition circulatory stimulants (camphor in oil or strophanthin) and a trace-element mixture were given. 88 of 94 affected cattle treated this way recovered, compared with only 19 of 50 that were treated with quinuronium or haemoplasmodin alone. In 10-15% of cases the course of treatment had to be repeated after 5-6 days.

To study toxic substances excreted by or formed from theileria, mice were fed milk, whole blood or serum from infected cattle. The highest mortality was in mice given blood collected between the 2nd and 18th days of illness; 77% died 9-14 days after administration. One-third of mice given blood collected between the 19th and 50th days of illness died about 18 days afterwards. Serum was as toxic as whole blood. Milk collected between the 1st and 7th days of illness killed 83.8% of mice (after about 5 days) and that taken on the 8th-11th days killed all the mice (after about 8 days). The nature of the toxic substance was not investigated.—R.M.

Stepanova, N. I. (1961). [Complement fixation test for bovine anaplasmosis.]—Veterinariya, Moscow No. 4 pp. 45-48. [In Russian.] 3565

Trials in experimentally infected sheep and naturally infected cattle showed that the c.f. test is a practical method of diagnosing this disease. The antigen was obtained from the erythrocytes of infected splenectomized sheep.—M.G.G.

Baker, N. F., Osebold, J. W. & Christensen, J. F. (1961). Erythrocyte survival in experimental anaplasmosis.—Amer. J. vet. Res. 22, 590-596. [Authors' summary modified.] 3566

Using Cr^{61} -labelled r.b.c. it was found that the r.b.c. survival during the haemolytic crises in splenectomized calves infected with *Anaplasma marginale* is reduced 5- to 10-fold. Since animals appear to be able to increase their production of haemoglobin by only 4 to 6 times, this increased destruction of r.b.c. would result in severe anaemia.

It is suggested that a hypothetical "limiting factor" in the maximal rate at which r.b.c. are removed in anaplasmosis may be the maximal rate at which the reticuloendothelial system may function in their catabolism.

It is argued that the anaemia in this disease is primarily, if not entirely, due to haemolysis.

Fleck, D. G. (1961). **Serological tests for toxoplasmosis.** — Nature, Lond. 190, 1018-1019. 3567

Absorption of a high-titre human anti-toxoplasma serum with human r.b.c. coated with toxoplasma antigen removed the haemagglutinating antibody but the dye test and c.f. antibodies were unaffected. It was concluded that the antigen or antigens responsible for the haemagglutination reaction differ from those responsible for reactions to the dye and c.f. tests.—M.G.G.

Lund, E., Lycke, E. & Sourander, P. (1961). **A cinematographic study of Toxoplasma gondii in cell cultures.** — Brit. J. exp. Path. 62, 357-362. [Authors' summary modified.] 3568

A cinematographic study was made on cultured cells infected with *T. gondii*. Details of the parasite multiplication resulting in binary fission were observed. Clones were formed by repeated division of parasites. The final event in parasitization was rupture of the host cell. This followed immediately after a division of parasites. Parasites of different generations were of equal size. Liberated parasites moved actively, penetrated into new cells within a few seconds and underwent a cycle of multiplication. [There are four plates of photomicrographs.]

See also abstr. 3609 (effect of *Eperythrozoon* on lymphocytic choriomeningitis in mice).

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

Gianturco, R. (1961). Teoria originale sulla patogenesi dell'afta epizootica e relazione su un nuovo metodo di terapia. [Pathogenesis of foot and mouth disease and thyroxine therapy.]—Zooprofilassi 16, 113-117. [Summaries in English.] 3569

G. treated 60 infected cattle and 87 infected pigs with thyroxine, injected s/c in a single dose of 2 g. per kg. body wt. Recovery was completed 4-6 days after treatment in 54 cattle and 80 pigs. G. claimed that treatment speeded recovery, but does not state the time taken for untreated animals to recover.—R.M.

Lübke, A. & Seifert, E. (1961). Über den Einfluss einer akuten Hypoxydose durch Blutungsanämie auf die durch das Maul- und Klauenseuche-Virus verursachte Myokarditis. [Influence of acute hypoxia from haemorrhagic anaemia on myocarditis caused by foot and mouth disease virus.]—Zbl. VetMed. 8, 360-368. [Summaries in English, French and Spanish.] 3570

Acute hypoxia in the heart muscle was induced in adult mice by cardiac bleeding. They were subsequently subjected to excessive exercise and infected i/p with either of two strains of F. & M. disease virus of different virulence. Myocardial lesions so produced were more severe than in non-anaemic mice which had not been subjected to stress.—E.G.

Gierloff, B. C. H. (1961). **Some observations concerning titration of foot-and-mouth disease virus in 1-10 day old mice.** — Acta vet. scand. 2, 120-128. [In English. Summaries in Ger-

man and Danish. Author's summary modified.] 3571

Susceptibility to infection of white mice decreased with increase in age and a difference in age of the mice of more than two days should be avoided when titrating F. & M. disease virus. Mice aged 2-4 days were best.

Culture adapted strains of virus appeared more infective to the mice than the cattle adapted ones—even after a further animal passage.

Nine days of inspection after inoculation seemed necessary in order to get the final values of mortality (LD_{50}), especially when the virus was not highly infective, but the mortality within the first four days indicated if 6 days would be sufficient.

Rivenson, S. & Segura, M. (1960). Técnica de neutralización indirecta de virus aftoso inactivado. [Indirect neutralization test for inactivated foot and mouth disease virus.]—Rev. Invest. Ganad. No. 9 pp. 187-194. 3572

F. & M. disease virus inactivated by heat or ultra-violet light was placed in contact with different dilutions of immune serum for 24 hours at 4°C. Active virus was then added, and the mixture incubated for 60 min. at 26°C. before being injected into lactating mice. The mortality rate in these animals over the next 72 hours was compared with that in mice inoculated with a mixture of active virus and immune serum that had been in contact with normal epithelium.—M.G.G.

Babini, A. & Sacco, T. (1960). Sul potere antigenico di alcuni ceppi di virus aftoso coltivati su monostriati cellulari di rene bovino e loro impiego per la produzione di sieri iperimmuni devianti di cavia. [Antigenicity of foot and mouth disease virus grown in monolayer bovine kidney cell culture.]—Atti Soc. Ital. Sci. vet. 14, 690-693. [Summaries in English and French.] 3573

The virus grown on bovine kidney cell culture retained its infectivity and immunogenicity and the serum of g.pigs immunized with it had adequate complement-fixing properties; it is considered that it has possibilities for immune serum and vaccine production.—T.E.G.R.

Zahran, G. E. D. (1961). Foot-and-mouth disease virus. I. Propagation of 3 immunologic types of virus in chicks. II. Propagation and modification of 3 immunologic types of virus in embryonating chicken eggs.—Amer. J. vet. Res. 22, 518-526 & 527-532. [Author's summaries modified.] 3574

I. One Venezuelan and 2 Brazilian strains of F. & M. disease virus, representing types Vallée A, Vallée O, and Waldmann C, were propagated successfully in chicks aged 1 to 29 days. Type O reached 84, virus type A reached 55, and virus type C reached 50 passages. Loss of pathogenicity for cattle was observed in 3 cattle infected with the 45th chick passage of virus type C, and in 1 of 2 inoculated with the 50th passage of virus type A.

II. Two Brazilian strains of types A and C, and 1 Venezuelan strain of type O, which had been maintained in chicks for 5 to 50 passages, were successfully propagated in chick embryos for 20 to 30 passages.

The 3 egg-adapted virus types underwent a marked loss of pathogenicity for cattle. Four of 5 cattle that did not react to inoculation with these strains developed a strong immunity as judged by the antibody titre of their serum and by their resistance to challenge with bovine virus.

Morozzi, A. (1960). Tentativi di vaccinazione dei suini contro l'afra epizootica. [Vaccination of pigs against foot and mouth disease.]—Atti Soc. Ital. Sci. vet. 14, 694-699. [Summaries in English and Spanish.] 3575

Monovalent (A) and bivalent (OA) foot and mouth disease vaccines prepared from virus grown in monolayers of calf kidney cells, adsorbed on aluminium hydroxide and

attenuated by formalin and heat did not immunize pigs.—T.E.G.R.

Melendez, L. (1961). Aislamiento e identificación de virus de fiebre aftosa procedente de vesículas en la epidermis de un ser humano. [Isolation and identification of foot and mouth disease virus from skin vesicles of a human being.]—Bol. Ofic. sanit. pan-amer. 50, 135-137. [Summary in English.] 3576

An agent pathogenic for bovine kidney cell culture, g.pigs and unweaned mice, isolated from vesicles on the hand of a laboratory worker engaged on F. & M. disease research, was identified as F. & M. disease virus Type O.—E.G.

Kubin, G. (1961). Interferenz zwischen dem Virus des Bläschenausschlags des Rindes und dem Virus der Maul- und Klauenseuche. [Interference between the viruses of vesicular exanthema and foot and mouth disease.]—Wien. tierärztl. Mschr. 48, 265-277. [Summaries in English, French and Italian.] 3577

Cattle and g.pigs, infected with a coital vesicular exanthema virus and subsequently with the virus of F. & M. disease, developed F. & M. disease of a milder form and later than untreated controls. In unweaned mice, injected i/p with a mixture of the two viruses, virulence of the F. & M. disease component appeared to be reduced. Attempts to inhibit F. & M. disease virus in cell culture by adding inactivated exanthema virus were inconclusive nor was it possible to demonstrate in g.pigs interference between alcohol and acetone fractions of vesicular exanthema virus and F. & M. disease virus.—E.G.

Gagliardi, G., Borghi, G. & Girotto, V. (1960). Isolamento e coltivazione del virus di Aujeszky su embrioni di pollo e monostriati cellulari di differente origine. [Isolation and culture of Aujeszky's disease virus on chick embryos and monolayer cell cultures.]—Atti Soc. Ital. Sci. vet. 14, 703-707. [Summaries in English and French.] 3578

The virus was grown in embryonated egg yolk, on rabbit and calf kidney cell monolayers and on chick embryo fibroblasts. Virus of fourth passage in yolk and seventh passage in monolayer cell culture was titrated in rabbits and in calf kidney cells.—T.E.G.R.

Berbinski, K. & Tsaga, L. (1961). [Immune globulins for protecting piglets from Aujeszky's disease.]—Vet. Sbirka, Sofia No. 4 pp. 3-8. [In Bulgarian.] 3579

Immune globulin prepared from hyperimmune Ajuszesky's disease serum protected 429 of 474 piglets (90%) on infected farms, whereas hyperimmune serum protected only 256 of 343 (25%). Of 40 controls, 15 died.

—R.M.

Huygelen, C. (1960). La vaccination anti-rabique des ruminants. Historique et expériences récentes. [Immunization of ruminants against rabies.]—Bull. agric. Congo 51, 1297-1315. [In French.]

3580

This paper is largely a history of the vaccination of ruminants against rabies. A brief account is given of a trial in which 11 cattle and 5 sheep were inoculated with 2 ml. of 40% H.E.P. Flury vaccine. Antibodies appeared in 7 of the cattle, but in none of the sheep.—M.G.G.

Becker, P. (1961). Die Ausbreitung des Tollwutvirus verschiedener Stämme in den Organen von Albino-Mäusen. [Spread of different strains of rabies virus in organs of mice.]—Mh. Tierheilk. 13, 90-95.

3581

Results in mice with three fixed and one street rabies virus indicated that after plantar infection distribution appeared to be along the nerves. Following i/m infection, however, with a fixed virus which had been adapted to the i/m route, it was shown that distribution could also be by the circulatory system. Preference for either route appeared to be strain-specific.—E.G.

Amies, C. R. (1961). Loss of immunogenic properties of vaccinia virus inactivated by formaldehyde.—Canad. J. Microbiol. 7, 141-152. [Author's abst. modified.]

3582

Experiments were carried out with relatively pure suspensions of vaccinia elementary bodies and a constant concentration of formaldehyde. The course of inactivation showed wide deviations from that of a first-order reaction and it was not possible to determine the length of time required to reduce the infectivity exactly to zero. Immunogenic properties were destroyed by the time that infectivity was no longer demonstrable.

Locke, L. N. (1961). Pox in mourning doves in the United States.—J. Wildlife Mgmt 25, 211-212. [Author's summary modified.]

3583

Pox infection occurred in mourning doves in at least 8 States in 12 outbreaks.

Unsuccessful attempts were made to transmit both fowl pox (chicken isolate) and passerine pox (cowbird isolate) to mourning doves.

Anon. (1961). More virus inhibitors.—Lancet, April 8th, 755-756.

3584

Strains of Asian (A2) influenza virus were divided into 2 groups by their reaction with non-antibody inhibitors in serum. "Avid" strains were inhibited by certain fractions of normal serum, notably acid glycoprotein. "Non-avid" strains were inhibited by antibody in immune serum only in the presence of a heat-labile co-factor which may be related to some components of complement.—M.G.G.

Olson, T. A., Kennedy, R. C., Rueger, M. E., Price, R. D. & Schlottman, L. L. (1961). Evaluation of activity of viral encephalitides in Minnesota through measurement of pigeon antibody response.—Amer. J. trop. Med. Hyg. 11, 266-270.

3585

Groups of 60 pigeons were kept in cages at four locations. Blood samples were examined for Western equine encephalomyelitis antibodies at monthly intervals. In three of the locations, between 30 and 70% of the pigeons developed serum antibodies during two years. In the fourth location only one pigeon developed antibodies during the same period.—R.M.

Anon. (1960). United Nations. Report to the governments of Afghanistan, India, Iran, Iraq, Pakistan, Turkey and the United Arab Republic (Northern Region) on the 1960 epizootic of African horsesickness. pp. 20. Rome: Food & Agriculture Organization of United Nations. (FAO Report No. I-6274).

3586

Between June and August 1960, P. G. Howell, during visits to India, Iran, Iraq, Pakistan, Turkey, and the United Arab Republic, advised on vaccine production, diagnosis, and future research with regard to African horsesickness. His report makes recommendations on the provision of mice, antigens, immune sera, and vaccines, and describes the techniques of isolating and identifying the virus and preparing vaccine.

—M.G.G.

Anon. (1961). Equine virus rhinopneumonitis: influenza-like respiratory infections: "equine virus abortion".—Vet. Rec. 73, 604-605 & 606.

3587

Equine viral pneumonitis has recently been diagnosed in Great Britain and Ireland. The symptoms, gross and microscopic lesions, preventive and control measures, and directions for the dispatch of specimens for laboratory examination are described.

—M.G.G.

Scott, G. R. & Rampton, C. S. (1961). Yield base for caprinized rinderpest vaccine.—Bull. epiz. Dis. Afr. 9, 5-7. [Summary in French. Authors' summary modified.] 3588

The mean yield from ten consecutive batches of caprinized virus averaged $10^{3.75}$ I.D.₅₀ per g. of goat spleen processed. The mean annual yield per g. of goat spleen was 52 field doses.

Snowdon, W. A. & French, E. L. (1961). A papular stomatitis of virus origin in Australian cattle.—Aust. vet. J. 37, 115-122. [Authors' summary modified.] 3589

A papular stomatitis of virus origin affecting cattle is recorded for the first time in Australia. Cytopathic agents were isolated in bovine testis tissue cultures from eleven cases on six properties.

Field observations were carried out on one property over three successive years and on other groups of cattle on single occasions.

A description is given of the lesions, which were confined to the mouth and muzzle.

The incidence in 10 groups of young cattle ranged from 10% to 100%. The duration of clinically detectable infection in individual animals varied from less than 17 days to more than 227 days. A recurrence of the disease was observed in 16%, 53% and 33% of three groups of cattle studied intensively.

Clinically and histologically the lesions were similar to those described for papular stomatitis occurring in cattle in Germany, and East Africa.

The authors discussed the economic importance and differential diagnosis of papular stomatitis in Australia.

Kötsche, W. (1961). Enzootische Ausbrüche einer infektiösen Stomatitis bei Rindern. [Outbreaks of infectious stomatitis in cattle in East Germany.]—Mh. VetMed. 16, 211-213. 3590

A highly contagious form of stomatitis in cattle characterized by erosions and papules, was believed to be due to a virus. Affected cattle recovered within 10-17 days, but depigmented scars persisted for some time. There was no excessive salivation. Baby mice 3-4 days old, infected i/p with a 20% suspension of affected oral tissue, failed to develop any symptoms.—E.G.

Langer, P. H. (1960). The effects of infectious bovine rhinotracheitis-infectious pustular vulvovaginitis (IBR-IPV) virus on newborn

calves from immune and nonimmune dams.

—Dissertation, Cornell pp. 39. [Abst. from Diss. Abstr. 21, 1332.] 3591

Thirty calves 1 to 3 days of age were obtained from herds in which about half of the cows had been immunized against bovine rhinotracheitis. Colostrum, and serum from calves before and after taking colostrum, were sampled. Calves were given the virus intravenously and by feeding. Susceptibility was indicated by a rise in temperature, leucocytosis for several days, anorexia, listlessness, respiratory signs and occasional death.

All nine calves that received colostrum from non-immune cows showed typical clinical response approximately 1.5 days after i/v inoculation and 4 days after virus was fed. Four calves recovered, three were killed when moribund and two died. All except one had pathological changes indicative of bovine rhinotracheitis infection.

As determined by neutralization tests using undiluted serum mixed with 100 TCID₅₀ in primary bovine kidney cell cultures, 10 of 14 calves from immunized dams showed antibodies after colostrum. Antibodies disappeared between the 7th and 31st days of life, or at an average of 20 days. When given virus i/v or by feeding, one showed a clinical response like the calves from non-immune mothers and two others showed a delayed response.

Virus was recovered at intervals from faeces and nasal secretions of both immune and non-immune calves. No virus was recovered from blood or urine. No virus was recovered from uninoculated calves.

Intercurrent pneumonia and diarrhoea were observed in inoculated as well as uninoculated calves. Blood, nasal secretions, faeces, and lung from affected calves produced cytopathic changes in cultured bovine kidney cells.—R.M.

Abinanti, F. R., Hoerlein, A. B., Watson, R. L. & Huebner, R. J. (1961). Serologic studies of myxovirus para-influenza 3 in cattle and the prevalence of antibodies in bovines.—J. Immunol. 86, 505-511. [Authors' summary modified.] 3592

The relative sensitivity of the haemagglutination inhibition (HI), neutralization (N) and complement-fixation (c.f.) tests for detecting para-influenza 3 antibodies in bovine sera was compared. The HI and N tests were similar in sensitivity; the c.f. test was less sensitive but appeared to be useful in

detecting recent infections. The temporal appearance and persistence of each type of antibody was studied.

A serological survey of market cattle bled at slaughter showed that at least 70% had para-influenza 3 antibodies and that infection was widely distributed geographically. More new infections appear to occur in autumn than in other seasons.

Battistacci, M. (1960). *Su di un episodio di trasmissione di papillomatosi bovina con tanaglia da tatuaggio. [Transmission of bovine papillomatosis by tattooing forceps.]*—*Atti Soc. Ital. Sci. vet.* 14, 177-181. [Summaries in English and French.] 3593

Papillomata developed on the inside of the ear flap of 25 of about 80 cattle that had been tattooed 2 months previously; the warts were limited to the tattoo marks and disappeared after 6 months.—T.E.G.R.

Papparella, V. & Compagnucci, M. (1961). *Variazioni della respirazione (QO_2) nelle membrane corioallantiodee di embrioni di pollo indotte da un infravirüs isolato da un bovino leucemico. [Changes in the respiration of chick chorio-allantoic membrane caused by bovine leucosis virus.]*—*Zooprofilassi* 16, 105-111. 3594

The virus isolated by Papparella [V.B. 29, 2557 & 3901] reduced the oxygen consumption of chorio-allantoic membrane, particularly 24 hours after infection.—R.M.

Abinanti, F. R. & Warfield, M. S. (1961). *Recovery of a hemadsorbing virus (HADEN) from the gastrointestinal tract of calves.*—*Virology* 14, 288-289. 3595

Six isolates were made of a virus from the faeces of 5 normal calves on 3 widely separated farms. It adsorbs erythrocytes, has a high haemagglutination titre, resists ether, and is highly resistant to heat. Its size is about 30 μ . It is not pathogenic for unweaned mice and does not grow on allantoic membrane of embryonated eggs.—M.G.G.

Taylor, R. L. (1961). *New laboratory tests for hog cholera diagnosis.*—*Vet. Med.* 56, 229-232. [Abst. from author's summary.] 3596

The two tests described are based on the following findings. (1) Pancreatic extracts from normal and swine fever immune pigs haemolyse red blood cells of rabbits, whereas pancreatic extracts from swine fever infected pigs do not. (2) Pancreatic extracts from normal and swine fever immune pigs

hydrolyse starch, giving a yellow colour with iodine. This hydrolysis is assumed to be due to amylase activity. Pancreatic extracts from infected pigs do not hydrolyse starch as rapidly: they give a purple colour with iodine.

The pancreas appears to deserve greater attention in swine fever and possibly in other diseases.

Okaniwa, A. (1961). *[Pathological studies on swine fever. VI. Vital-staining by infusion of trypanblue into infected pigs.]*—*Bull. Nat. Inst. Anim. Hlth, Tokyo* No. 41 pp. 55-72. [In Japanese. Summary in English.] 3597

Intravenous injection of 2% trypanblue into swine fever infected and control pigs showed that the cells of the reticulo-endothelial system are not uniformly affected by swine fever. An increase in dye-granule accumulation was observed in the stellate cells of the liver and the reticulum cells of the lymph nodes and red pulp of the spleen whilst a decrease was observed in the reticulum cells of the cell-poor substance of lymph nodes and in the capillary endothelium of the adrenal gland. Irregular accumulations of dye-granules and diffuse staining of cells occurred in the epithelium of the kidney tubules. Inflammatory cells infiltrating the tissues of infected pigs were vitally-stained either positively or negatively.—A. ACKROYD.

Matthias, D. & Klaus, H. (1960). *Der Einfluss von Urethan auf das klinische und pathologisch-anatomische Bild sowie auf die Virusvermehrung im lymphatischen Gewebe bei Schweinen mit Schweinepest. [Influence of urethane on the symptoms and pathology of swine fever and on multiplication of virus in lymphatic tissue.]*—*Arch. exp. VetMed.* 14, 1111-1128. 3598

By anaesthetic or sub-anaesthetic doses of urethane the authors produced a marked reduction in the number of lymphocytes in the lympho-reticular tissues of pigs, before infecting them with swine fever virus. Pigs given anaesthetic doses of urethane at least 3 days before infection did not develop fever, splenic infarcts, or haemorrhagic infarcts in lymph nodes. Those which had received either sub-anaesthetic or anaesthetic doses less than 3 days before experimental infection, developed more or less characteristic lesions of swine fever. P.M. appearance and histological lesions in those which had received urethane in sub-anaesthetic doses on the day of infection, were typical of swine fever.

Lymphatic tissues are stated to be unlikely primary sites of multiplication of virus. Absence of vascular lesions and of splenic infarcts in infected pigs, which had been given large doses of urethane for several days, appeared to contradict the theory that the vascular endothelium is a preferential site of virus multiplication. It was concluded that fibrinoid thickening of vascular walls in swine fever is predominantly due to secondary processes which develop at sites of endothelial damage as a result of slowing of the circulation.—E.G.

Luedke, A. J. & Dunne, H. W. (1961). **Focal necrosis in the mucosa of the gallbladder in pigs with hog cholera.**—Amer. J. vet. Res. 22, 391-395. [Authors' summary modified.] 3599

Areas of infarction were observed in 106 (40%) of the gall-bladders from 265 pigs experimentally infected with swine fever.

None of the secondary bacterial invaders appeared to have influenced the occurrence of areas of infarction. The only common factor known was the virus.

The areas of infarction in the gall-bladder appeared to be comparable with those in the large intestine and were believed to be pathognomonic for swine fever.

Kretzschmar, C. (1961). Über Schädigungen, welche im Anschluss an die Vakzinierung von Schweinen mit Kristallviolettvakzine (KVV) auftreten, und deren weitere Folgen. [Harmful after-effects in pigs given crystal violet vaccine.] — Mh. VetMed. 16, 344-349. 3600

Harmful after-effects in pigs given crystal violet vaccine are abscess and necrosis of the injection site often followed by protracted liver dystrophy and cirrhosis; pneumonia associated with necrosis of the injection site; abortion and stillbirth and poor development of the young of sows immunized during pregnancy; peracute fatal disease appearing 6-12 days after immunization, probably due to *coli* enterotoxaemia. Prevention and treatment of these conditions are good hygiene and nutrition, treatment of abscesses, and oral administration of chloramphenicol in *coli* enterotoxaemia.—M.G.G.

Polo Jover, F. & Sanchez Botija, C. (1961). La peste porcina africana en España. [African swine fever in Spain.]—Bull. Off. int. Epiz. 55, 107-147. [In Spanish. In French]

pp. 148-173. Summary in English pp. 174-175.] 3601

African swine fever appeared in Spain in May 1960, in the province of Badajoz. By December 1960, 20 provinces had been affected by 630 secondary outbreaks, and 119,543 pigs had died or been destroyed. Losses were estimated at 559 million pesetas. The main reasons for the spread of the disease were feeding unboiled swill and the clandestine transport of pigs in the incubation period. Houseflies and other insects may have carried the disease. The clinical picture, P.M. and histological findings, diagnosis by the tissue culture method and control measures were described.—M.G.G.

Boulanger, P., Bannister, G. L. & Greig, A. S. (1961). The study of some viral infections of swine by means of the agar double-diffusion precipitation reaction. — Canad. J. comp. Med. 25, 113-120. [Summary in French. Authors' summary modified.] 3602

The agar double-diffusion precipitation reaction was used for detection of antibodies in the serum of pigs infected with enteroviruses and for detection of these viruses in tissue culture.

Specificity and sensitivity of the test were decreased or increased by varying the space between the reaction basins. Teschen virus was differentiated from the porcine enterovirus isolated by Greig (PE-1) and from the one described by Betts (T-80).

Piercy, S. E. (1961). The immunising efficiency of canine distemper virus grown in tissue culture.—Vet. Rec. 73, 479-480. 3603

Although it has been reported by some investigators that the dose of living attenuated canine distemper virus vaccine required to immunize ferrets is smaller when the virus is grown in tissue culture rather than in fertile eggs, little evidence was found that chick embryo tissue culture vaccine prepared with the Beckenham embryo adapted strain of Ondersteepoort distemper virus was a more efficient immunizing agent in ferrets than egg vaccine.—A. ACKROYD.

Kuwert, E. (1961). Zur Frage verwandtschaftlicher Beziehungen zwischen dem Virus der Staupe und dem Erreger der Tollwut. [Absence of antigenic relationship between the viruses of distemper and rabies.]—Arch. exp. VetMed. 15, 12-29. 3604

K. was unable to confirm findings by Finzi [V.B. 21, 2891] on group immunity

between distemper and rabies. Attempts to demonstrate antigenic relationship between the two viruses by cross-complement fixation, cross-neutralization and cross-infection experiments, failed.—E.G.

Espmark, J. A. & Salenstedt, C. R. (1961). **Hemagglutination-inhibition test for titration of antibodies against Hepatitis contagiosa canis (infectious canine hepatitis).** — Arch. ges. Virusforsch. 11, 64-72. [In English.] **3605**

For the titration of canine virus hepatitis antibodies, the haemagglutination-inhibition test was a simple and sensitive alternative to the c.f. and virus neutralization tests, contrary to the findings by Fastier [V.B. 28, 432] and Mantovani & Gramenzi (1956).—E.G.

Persson, F., Persson, S. & Sibalin, M. (1961). **The aetiological role of hepatitis contagiosa canis (HCC) in chronic nephritis in dogs.** — Acta vet. scand. 2, 137-150. [In English. Summaries in German and Swedish. Abst. from authors' summary.] **3606**

Dogs without antibodies were inoculated with hepatitis virus, but no renal changes attributable to the virus were detected. Of 154 dogs clinically examined, 64% had neutralizing antibodies and 51% were positive to the c.f. test, yet there was little relationship between the presence of antibodies and renal damage.

Dumith Arteaga, G. (1960). Mixomatosis infecciosa del conejo. Estudio preliminar de la enfermedad en Venezuela. [Infectious myxomatosis of rabbits in Venezuela.] — Bol. Inst. Invest. vet. Maracay 12, No. 27 pp. 40-46. [Summary in English.] **3607**

Myxomatosis was almost unknown in Venezuela until recently. An account is given of an outbreak in domestic rabbits with 100% mortality. Experimental transmission (with 100% mortality) was achieved by scarification and by i/p and s/c inoculation but not by contact.—T.E.G.R.

Kilham, L. (1961). **Rat virus (RV) infections in hamsters.** — Proc. Soc. exp. Biol., N.Y. 106, 825-829. **3608**

K. isolated previously three identical strains of apparently latent, cytopathic virus from rats by adding minced rat tissues to cultures of rat embryo cells [Virology 7, 428 (1959)]. The virus was also pathogenic for hamsters, particularly unweaned. It has been passaged 20 times in unweaned hamsters.

—R.M.

Seamer, J., Gledhill, A. W., Barlow, J. L. & Hotchin, J. (1961). **Effect of Eperythrozoon coccoides upon lymphocytic choriomeningitis in mice.** — J. Immunol. 86, 512-515. [Authors' summary modified.] **3609**

The pathogenicity of lymphocytic choriomeningitis virus inoculated s/c and i/p was much greater in mice recently infected with *Eperythrozoon coccoides* than in normal mice. This was observed with two strains of virus and a tissue cultured subline of one of them. With the more virulent strain which was able to kill normal mice by the i/p route, the mean survival time of the *E. coccoides* treated mice was shorter than that of the normal mice. The enhancing effect of *E. coccoides*, given as a 10⁻⁶ dilution of infected mouse blood, was maximal when the parasite was inoculated from 4 days before to 2 days after the virus. The similarity of these results to those reported earlier with mouse hepatitis virus is discussed.

Mannini, A. & Medearis, D. N., Jr. (1961). **Mouse salivary gland virus infections.** — Amer. J. Hyg. 73, 329-343. **3610**

Virus was demonstrated in the salivary glands of 3 of 263 mice. Mice could be infected by intranasal or oral administration of the virus. Infected mice transmitted the virus to cage-mates, but not to mice in adjacent cages. Transfer of immunity by mothers to young both before birth and in the colostrum was demonstrated.—M.G.G.

Keeble, S. A. (1961). **Virus B infection of monkeys: a disease communicable to man.** — Vet. Rec. 73, 618-620 & 621. [Author's summary modified.] **3611**

Virus B was first isolated from a man who died after being bitten by a monkey. It has since caused at least 12 other human deaths from respiratory collapse after ascending myelitis.

The lesions, vesicles and ulcers, are on the lips and tongue. The monkey may appear to be relatively normal, and recovery is usually spontaneous.

Infected animals represent a considerable hazard and gloves, masks and gowns should be used by those attending monkeys.

Abdel Aziz, A. H., El-Nassari, B. B. & Ibrahim, K. (1960). **Haemoagglutination activity of fowl-plague virus in relation to some avian and mammalian red blood cells, and its comparison with N.C.D. virus haemoagglutina-**

tion. — J. Arab. vet. med. Ass. 20, 151-156. [In English.] 3612

Since haemagglutination of rabbit erythrocytes took place within 2-3 hours in the presence of fowl plague virus but not Newcastle disease virus, differentiation between the two diseases by this method was possible. Pigeon erythrocytes were agglutinated by fowl plague virus and could be used instead of fowl blood in the haemagglutination test for fowl plague.—E.G.

Monda, V., Tanga, G. & Guarino, C. (1960). Isolamento e studio delle caratteristiche antigeniche di due ceppi di virus di Newcastle isolati dal passero. [Antigenic properties of Newcastle disease virus isolated from a sparrow and a canary.]—Atti Soc. ital. Sci. vet. 14, 736-740. [Summaries in English and German.] 3613

Two strains of Newcastle disease virus isolated from a sparrow and a canary with natural infection were closely related antigenically to Asplin's strain F.—T.E.G.R.

Gagliardi, G. & Girotto, V. (1960). I. Titolo d'infettività su pulcini di tre ceppi della pseudopeste di differente patogenicità. II. Idrovaccinazione: risposta immunitaria a tre ceppi del virus della pseudopeste di differente patogenicità. [Comparison of three strains of Newcastle disease virus.]—Atti Soc. ital. Sci. vet. 14, 714-717 & 717-721. [Summaries in English and French.] 3614

The infectivity for chicks of Strain F, Hitchner's B-1 strain and a fully virulent strain was unaffected by route of administration (oral or conjunctival), dose or virulence. Although the three strains had similar infectivity titres when administered in drinking water to chicks possessing maternal antibodies, the virulent strain conferred much better immunity than the attenuated strains.

—T.E.G.R.

Quesada, A., Izzi, R. & Lombardi, D. (1960). Indagini sulle modalità di diffusione del virus di Newcastle nell'organismo di animali sensibili. [Spread of Newcastle disease virus in the animal body.]—Atti Soc. ital. Sci. vet. 14, 730-736. [Summaries in French and German.] 3615

An attenuated (Strain F) and a fully virulent strain showed marked neurotropism and pneumotropism for chicks. The attenuated strain multiplied slowly in the organs (eclipse phenomenon) while the

virulent one rapidly and progressively invaded the tissues and caused death.—T.E.G.R.

Borzemska, W., Marek, K. & Twardowski, K. (1961). Aktywność liofilizowanego szczepu F₁₀₇ wirusa pomoru rzekomego przechowywanego w różnych temperaturach. [Storage life of freeze-dried Strain F-107 of Newcastle disease virus at different temperatures.]—Med. Wet., Warszawa 17, 463-466. [Summaries in English, French, German and Russian. Abst. from English summary.] 3616

Freeze-dried F-107 vaccine can be stored at minus 10°C. for at least one year, and at 4°C. for 5 months without a loss of the original concentration (with the loss of one logarithm LD₅₀ after 9 months). At room temperature there was a rapid decrease of potency after 5 months.

Jerushalmi, Z., Kohn, A. & De Vries, A. (1961). Interaction of myxoviruses with human blood platelets in vitro.—Proc. Soc. exp. Biol., N.Y. 106, 462-466. [Authors' summary modified.] 3617

Influenza and Newcastle disease viruses are adsorbed to red blood cells and to platelets in a similar manner. Evidence is presented that similar virus receptors exist on the surface of r.b.c. and of platelets. Virus is adsorbed to platelets in the absence of cations as well as after its previous elution and after receptor-destroying enzyme treatment of platelets. Elution of the virus from platelets is much slower and less complete than from r.b.c. These phenomena may be due to incorporation of virus particles into the platelets.

Woernle, H. (1961). Impfversuche mit Adsorbat-Vakzine bei der infektiösen Bronchitis des Huhnes. [An adsorbed vaccine against infectious bronchitis of fowls.]—Mh. Tierheilk. 13, 136-142. 3618

Preparation of 480 ml. of adsorbed avian infectious bronchitis vaccine from 120 g. of chick embryo chorioallantoic tissue and amniotic-allantoic fluid and embryonic liver of the second virus passage, inactivated with 0.2% formalin, was described. Evaluation of immune response was by the presence or absence of precipitating serum antibodies following intratracheal challenge with 0.2 ml. of supernatant fluid of homogenized embryonic material. Since in Germany the disease is generally not fatal, the use of live vaccines was not recommended.—E.G.

Bijlenga, G. (1960). Untersuchungen über die Wirksamkeit eines lebenden Impfstoffes gegen die infektiöse Bronchitis der Hühner mit einem am bebrüteten Hühnerei adaptierten, dem Trinkwasser zugefügten, autochthonen Virus-Stamm. [Immunization against avian infectious bronchitis by a field strain of virus attenuated by passage in chick embryos.]—Inaug. Diss., Bern pp. 48. 3619

Avian infectious bronchitis virus passaged in the chick embryo, was added to the drinking water. The 25th egg passage was too virulent for young chicks, but the 52nd passage was well tolerated and conferred immunity lasting at least 6 months.—E.G.

MacCullum, F. O., McDonald, J. R. & Macrae, A. D. (1961). Psittacine birds as a source of virus infection for man in England.—Mon. Bull. Minist. Hlth Lab. Serv. 20, 114-118. [Authors' summary modified.] 3620

Psittacosis virus was not isolated from any of 101 dead budgerigars, not associated with human illness, received mostly from Southern England but also from Wales and Scotland, from April 1958 to May 1960. Twenty-four other budgerigars suspected as a possible source of human infection were also negative. Although the number examined was small in relation to the budgerigar population the negative results suggest that budgerigars bred in Gt. Britain are not a common source of psittacosis infection of man.

Psittacosis virus was isolated from 3 of 28 sick or dead parrots or parakeets received from 24 different sources during the same period, and Keymer made five isolations from four sources in 1958-60 and Osborne two from one source in 1960. The isolation of the virus from these parrots and parakeets from several sources, all recently imported, indicates the possibility of introducing infection into a stock of budgerigars bred in Gt. Britain.

A firm diagnosis of psittacosis is not justified in a patient with pulmonary disease who is the owner of either a sick or healthy psittacine bird unless confirmed by serological tests. The risk from recently imported parrots and parakeets is greater than from budgerigars bred in Gt. Britain. It is hoped that extension of facilities for breeding parrots and parakeets in this country will reduce this hazard.

No evidence was found in 17 paralysed psittacine birds to suggest that poliomyelitis virus is likely to be the cause of paralysis in cage birds.

Holmes, J. R. (1961). Radiological changes in avian osteopetrosis.—Brit. J. Radiol. 34, 368-377. [Author's summary modified.] 3621

The radiological changes in 108 cases of experimentally induced avian osteopetrosis are described. The distribution of lesions in the skeleton and the age at which changes first appear in different bones is reported. It is considered that the radiological changes in the long bones may be divided into four groups. Generally the changes which develop in other parts of the skeleton resemble those in the long bones. Although 20% of the birds also had soft tissue tumours it is considered unlikely that these influenced the development or type of bone lesions produced by this viral agent.

The initial reaction of the long bone periosteum represents a characteristic response to any stimulus, and the radiological changes in the bird are compared with certain human bone diseases which show a somewhat similar radiological picture.

Baluda, M. A. & Jamieson, P. P. (1961). In vivo infectivity studies with avian myeloblastosis virus.—Virology 14, 33-45. [Authors' summary modified.] 3622

Avian myeloblastosis virus induces a variety of neoplastic diseases when injected into chicks. Assay by injection of the virus i/v into 11-day chick embryos was more sensitive than inj. into newly hatched chicks. In infectivity tests using serial dilutions of a virus suspension, a single infectious unit was sufficient to induce the disease. The results indicate that a single type of virus is responsible for the various types of neoplasia induced. A hypothesis based upon a competition between the disappearance of susceptible cells and transformation by the virus is presented to explain the unusual dose-response curve.

Kaeberle, M. L., Drake, J. W. & Hanson, L. E. (1961). Cultivation of duck hepatitis virus in tissue culture.—Proc. Soc. exp. Biol., N.Y. 106, 755-757. [Authors' summary modified.] 3623

Duck hepatitis virus was passed serially 7 times through monolayer chick embryo liver cell cultures. Multiplication was demonstrated by assay in embryonated hens' eggs and by gel diffusion precipitin test. Cytopathic effects were not observed.

Woernle, H. (1961). Erfahrungen mit der Präzipitationsreaktion im festen Agarmedium

bei der Diagnose von Viruskrankheiten. [The agar-gel precipitation reaction in the diagnosis of virus diseases.]—Mh. Tierheilk. 13, 111-116.

3624

A discussion on the technique, scope and value of the gel diffusion test in avian infectious bronchitis, fowl pox, Newcastle disease, swine fever and rabies.—E.G.

Smith, S. E. (1961). A maintenance medium for tissue culture virus studies.—Brit. J. exp. Path. 42, 232-235. [Author's summary modified.]

3625

The medium consists basically of a 5 to 10% dilution of a liver digest ultrafiltrate in balanced salt solution, and a method for preparation of the digest is given. It maintains cell structures in good health in the absence of serum and gives relatively little growth stimulation.

Isaacs, A. (1961). The antiviral action of interferon. In 'The Scientific Basis of Medicine: Annual Reviews, 1961.' pp. 21-30. [London: The Athlone Press. 40s.] [Author's conclusions modified.]

3626

Interferon is known to be produced during the growth of influenza virus in the chick embryo (Wagner, 1960) and during the growth of vaccinia virus in the rabbit skin (Nagano and Kojima, 1958); its appearance during the course of other viral infections in animals is under investigation, but it is speculated that it may play a role in recovery from many virus infections. Interferon, like antibody, is spontaneously liberated from cells, so that it has the opportunity to protect cells in its neighbourhood. It seems that a substance which originally had a regulatory function in glucose metabolism has become adapted to the function of a selective antiviral agent. These speculations at least give grounds for hope that some day interferon might be used to advantage.

Pospíšil, R., Polony, R., Mittermayer, T. & Vrtiak, J. (1961). Neorickettsiota ako nová antropozoonóza a jej súvislost s bronchopneumóniou telat. [Neorickettsiosis, a new zoonosis, and its relation to bronchopneumonia of calves.]—Čsl. Epidem. Mikrobiol. Immunol. 10, 98-101. [In Slovak. Summaries in English and Russian.]

3627

In a locality where there was an epidemic of bronchopneumonia in calves, 22 cattle attendants were examined by the micro-agglutination test. With "neorickettsial"

antigen Q 18, seven persons yielded titres of 1:20, six of 1:80, five of 1:160 and four of 1:40. With *Rickettsia conori* antigen seven yielded titres of 1:20, five titres of 1:40, four 1:80 and six were negative. Transmission of the infection from animals to man was discussed.—E.G.

Prat, J. (1961). Contribution à l'étude des néo-rickettsioses. [Neorickettsial infections in animals.]—Bull. Soc. Sci. vét. Lyon 63, 17-57.

3628

Results of a six-year study are discussed. Neorickettsia, it is stated, are widespread in nature and infect man and animals. They are intermediate between rickettsia and viruses of the psittacosis group. Neorickettsial infections were diagnosed serologically and various strains were isolated from animals and man with various syndromes (which are described) and identified by P. Giroud. The diseases included bronchopneumonia, encephalitis, abortion, haemoglobinuria in cattle; infections of new-born calves, including myopathy-dyspnoea; encephalitis in a dog; pulmonary syndrome in persons in contact with cattle with bronchopneumonia. In discussion on the paper the criticism was made that diagnosis had been based on serology and attention was drawn to the transfer of maternal antibodies to the foetus. Compliance with Koch's postulates is necessary in the determination of the causal agent of a disease.—T.E.G.R.

Brezina, R., Urvölgyi, J., Rosicky, B., Cilka, S., Dushniku, N., Naracik, K. & Dishnica, G. (1961). Rickettsioses and infections caused by viruses of the psittacosis-ornithosis-mammalian pneumonia group, in Albania.—J. Hyg. Epidemiol. Microbiol. Immunol., Prague 5, 85-88. [In English.]

3629

Tests for Q fever antibodies were positive in 5 of 132 cattle, 30 of 151 sheep and 3 of 24 pigs. Tests with a group antigen for the Bedsonia group, prepared from the "neorickettsia" isolated in Roumania by Draganescu *et al.* (1958), were positive in 17 of 139 cattle, 14 of 153 sheep and 7 of 24 pigs.

—R.M.

Derrick, E. H. (1961). The changing pattern of Q fever in Queensland.—Path. Microbiol., Basel 24, Suppl. pp. 73-79. [In English.]

3630

D. discussed Q fever in sheep shearers, a kangaroo-tick cycle for *R. burnetti*, and the increased incidence of infection in meat workers.—R.M.

IMMUNITY

Brown, H., Speer, V. C., Quinn, L. Y., Hays, V. W. & Catron, D. V. (1961). **Studies on colostrum-acquired immunity and active antibody production in baby pigs.**—J. Anim. Sci. 20, 323-328. [Authors' summary modified.] **3631**

One hundred and ninety-five piglets were used in five experiments. Colostrum-acquired antibodies persisted in the bloodstream of piglets for at least 6 weeks with no difference between pigs weaned at 2 weeks of age and pigs suckled by sows. Piglets produced antibodies actively in the presence of colostrum-acquired antibodies to a killed vaccine between 4 and 5 weeks of age. Injections of zymosan had no effect on the persistence of colostrum-acquired antibodies. Injections of zymosan injected simultaneously with the immunizing vaccine resulted in higher active antibody titres to *Serratia marcescens* and *Candida albicans* but not to *Escherichia coli*.

Pigs weaned at 2 weeks of age were capable of actively producing antibodies by 3 weeks of age. The response was low up to 4 or 5 weeks of age at which time the antibody response was great enough to be indicative of some protection for the pig.

Walker, F. C. & Rogers, A. W. (1961). **The greater omentum as a site of antibody synthesis.**—Brit. J. exp. Path. 42, 222-231. [Authors' summary modified.] **3632**

Serum antibody titres were studied in rabbits given a series of intraperitoneal injections of type III pneumococci. The titres were lower in animals from which the greater omentum had been removed.

Portions of the greater omentum were transplanted from rabbits immunized by the intraperitoneal route into the abdominal cavities of non-immune recipients. A characteristic rise and fall in serum antibody titre suggested active antibody synthesis by the graft within the host animal.

Rabbit serum containing the specific anti-pneumococcal antibody was labelled with ^{131}I , and administered to immune donor animals before transplantation of portions of omentum to non-immune recipients. Autoradiographic examination of the serum antibody found later in the recipients failed to detect any radioactivity.

^{14}C -labelled amino-acids were administered to non-immune rabbits that had received intraperitoneal grafts of omentum from immunized donors. Autoradiographic examination of the

specific antibody found in the serum of the recipients showed that it contained significant levels of radioactivity 8 hours and 5 days later.

These findings are discussed, and it is concluded that the greater omentum is an important site of active antibody synthesis following the intraperitoneal injection of antigen.

Barbu, E., Panijel, J. & Quash, G. (1961). **Caractérisation immunochimique des ribosomes. [Immunological and biochemical properties of "ribosomes" (ribonucleoprotein particles present in bacterial, animal and vegetable cells).]**—Ann. Inst. Pasteur 100, 725-746. [Summary in English.] **3633**

Precipitation tests revealed 3 kinds of antigen in ribosomes extracted from different species of bacteria: antigen common to all ribosomes in the form of ribonucleic acid; antigens of a protein nature common to ribosomes of certain species, such as *Escherichia coli*, *Salmonella*, *Shigella*, *Proteus* and *Serratia* on the one hand and *Clostridium welchii*, *Cl. sporogenes* and *Fusiformis* on the other; and strain-specific antigens, also of a protein nature.—M.G.G.

Bishop, D. W. & Gump, D. (1961). **Production of circulating antibody against defined antigen (BGG) by neonatal guinea pigs.**—Proc. Soc. exp. Biol., N.Y. 106, 24-27. [Authors' summary modified.] **3634**

G.pigs, injected with BGG and adjuvant immediately after birth produce circulating antibody, detectable by the passive cutaneous anaphylactic procedure (P.C.A.) but not by agar-diffusion tests. Sera collected 7, 9, 11, and 15 days after i/m inj. gave 7, 80, 94, and 100% positive P.C.A. reactions respectively. Rate of antibody production during the first week after birth is lower than that of adults. Capacity for humoral antibody formation probably exists at a reduced level in the foetus.

Payne, L. N. & Jaffe, P. (1961). **Genetic basis for graft-against-host immunological reactions between two inbred lines of chickens.**—Nature, Lond. 190, 373-374. **3635**

When blood from adult fowls is injected into chick embryos, the spleen of the embryo becomes enlarged as a result of proliferation of cells derived from the injected blood, except when the blood-donor and the embryo are from the same inbred line, in which case there is no splenic enlargement. The authors studied the genetics of this phenomenon by

interbreeding two inbred lines of White Leghorns.—R.M.

Beuche, H. (1961). Über die Isolierung blutgruppenspezifischer Antigene der Rindererythrozyten. [Isolation of blood-group antigens from bovine erythrocytes.]—Blut 7, 97-112. [Summary in English.] 3636

B. compared tryptic digestion with petroleum extraction. Antigen content was determined by a haemolysis-inhibition test. Immune sera prepared in rabbits from the two different antigens gave different results in antibody-neutralization tests.—R.M.

Urbaschek, B. & Trautwein, K. (1961). Occurrence of an Rh-like antigen in red cells of the sheep.—Nature, Lond. 191, 193. 3637

The Rh-antigen marked D according to Fisher is the most common in man and human D-erythrocytes are also agglutinated by an anti-Rh g.pig immune serum. Therefore, two

See also absts. 3465 (immunoelectrophoresis of extracellular antigens in streptococcal infections); 3466 (streptococcal infections); 3467-3469 (anthrax); 3479 (c.f. test in Johne's disease); 3485-3487 (swine erysipelas); 3505-3524 (brucellosis); 3529 (tetanus); 3531 (vibriosis); 3538 (increase in bactericidal antibodies after administration of endotoxin); 3554 (whole blood test for chronic respiratory disease); 3565 (c.f. test for bovine anaplasmosis); 3567 (toxoplasmosis tests); 3569-3577 (F. & M. disease); 3578-3579 (Aujeszky's disease); 3580-3581 & 3604 (rabies); 3582 (vaccinia); 3584 (virus inhibitors); 3585 (Western equine virus encephalomyelitis); 3586 (U.N. report on African horsesickness); 3588 (rinderpest); 3591 (infectious bovine rhinotracheitis — pustular vulvovaginitis virus); 3592 (myxovirus para-influenza 3 antibodies in cattle); 3596-3601 (swine fever); 3602 (study of swine viruses by agar double diffusion precipitation); 3603 (distemper); 3604 (antigenic relationship between distemper and rabies disputed); 3605 (Rubarth's disease); 3612-3616 (Newcastle disease); 3617 (myxoviruses); 3618-3619 (avian infectious bronchitis); 3624 (agar-gel precipitation virus diseases); 3626 (interferon); 3643, 3647, 3651, 3657 & 3658 (helminths).

PARASITES IN RELATION TO DISEASE [ARTHOPODS]

Ternovoi, V. I. (1961). [Wohlfartia infestation in fine-wooled sheep.] — Veterinariya, Moscow No. 6 pp. 60-63. [In Russian.] 3638

T. studied Wohlfartia myiasis (? *W. magnifica*) for three years in Kazakhstan: 1,065 sheep were examined, and 97.2% of wethers had larvae in the prepuce. The commonest sites in ewes were around the anus (in 60% of those examined) and on the posterior surface of the udder (40%). Maximum infestation occurred in June.

Larvae were resistant to chemicals. When 20-30% creolin emulsion was applied to sheep, the larvae dropped to the ground but survived; 40-70% emulsion killed the larvae but damaged tissues. The best method for prevention of myiasis was dipping or spraying with a mixture of 1% creolin and 0.25% BHC. Sheep should be inspected regularly and all uninfested wounds dressed with 12% BHC dust or a 50% aqueous suspension of powder containing 10% chlorophos (trichlorphon) or other specified emulsions. Infested wounds

anti-D sera occur, one the human anti-D and the other an animal immune anti-Rh serum which can be used as anti-D. There are many differences between these two sera: the anti-D itself appears to be different in that the rhesus D cannot be identical to the human D, since rhesus erythrocytes, while able to absorb the anti-D antibodies from a g.pig anti-rhesus erythrocyte immune serum, cannot absorb the anti-D from human anti-D serum, which itself can be absorbed easily by human D-erythrocytes. Boiling in distilled water did not free enough D from rhesus erythrocytes to enable the boiled cells completely to absorb human anti-D antibody. When sheep red cells suspended in distilled water are boiled, they can absorb completely anti-D antibodies from both anti-D sera from patients as well as from commercial anti-D test sera, while human erythrocytes, boiled in the same way, were not able to absorb anti-D to a similar extent.

—E.V.L.

were treated for 20 sec. with a 4% combined emulsion of BHC and DDT. Infested prepuce was treated with 3-5% potassium permanganate soln., with repetition every one or two days until the lesions healed.—R.M.

Horsfall, W. R. & Anderson, J. F. (1961). Suppression of male characteristics of mosquitoes by thermal means. — Science 133, 1830. [Authors' abst. modified.] 3639

Dimorphism in *Aedes stimulans* may be decreased possibly to obliteration by exposing larvae for most of their lives to abnormally high temperature. Determiners for maleness fail to express themselves when larvae are exposed to a temperature of 29°C. throughout their lives. Not only are male characteristics eliminated, but normal female ones such as ovaries, spermathecae, and cerci develop. The resultant adult is structurally a female. Forms showing characteristics of both sexes occur when the number of days of exposure to 29°C. is lessened.

PARASITES IN RELATION TO DISEASE [HELMINTHS]

Turner, V. (1961). *Fasciolozia konja. [Fascioliasis in horses.]* — Vet. Glasn. 15, 389-393. [In Croat.] 3640

In four horses which had died, acute fascioliasis was diagnosed from the presence of either juvenile flukes or typical lesions in the liver. By liver biopsy, fascioliasis was diagnosed with certainty in two and with probability in two other horses.—E.G.

Winterhalter, M. (1961). *Mogućnost liječenja metiljavosti goveda intramuskularnom aplikacijom mješavina tetraklorometana s parafinskim ili vegetabilnim uljima uz primjenu hijaluronidase. [Injectable mixture of carbon tetrachloride in oil and hyaluronidase for liver fluke in cattle.]* — Vet. Arhiv 31, 55-70. [In Croat. Summaries in English and German.] 3641

Tolerance to and anthelmintic efficacy of mixtures of CCl_4 and liquid paraffin or vegetable oil at various proportions with or without hyaluronidase, was tested in 90 cows, infested with fasciola, by the s/c or i/m routes. I/m injection with a 2:1 mixture of CCl_4 and vegetable oil, to which 150 i.u. of hyaluronidase had been added, was better tolerated and produced less severe reaction at the site of injection than a similar mixture but without hyaluronidase. Hyaluronidase also increased anthelmintic efficacy.—E.G.

Condy, J. B. (1961). *The effect of varying numbers of liver fluke (Fasciola gigantica) on the weight gain of Blackhead Persian lambs.* — Bull. epiz. Dis. Afr. 9, 11-13. [Summary in French. Author's summary modified.] 3642

F. gigantica infestation is more common in cattle than sheep. Infestation of five Blackhead Persian lambs with 10, 20, 40, 50 or 60 metacercariae appeared to depress weight gains.

Wickerhauser, T. (1961). *Immunobiologic diagnosis of fascioliasis. II. The in vitro action of immune serum on the young parasitic stage of F. hepatica — a new precipitin test for fascioliasis.* — Vet. Arhiv 31, 71-80. [In English. Summaries in French and Croat.] 3643

Precipitates were present at the oral and excretory openings of live young metacercariae of *Fasciola hepatica*, incubated in immune rabbit or ox serum. The microprecipitation test was reliable for rabbits and cattle but not horses.—E.G.

Strong, J. P., McGill, H. C., Jr. & Miller, J. H. (1961). *Schistosomiasis mansoni in the Kenya baboon.* — Amer. J. trop. Med. Hyg. 10, 25-32. 3644

An account of the intestinal, hepatic and other lesions.—R.M.

Lozanić, B. & Nevenić, V. (1961). *Prilog poznavanju helmintološke faune lisica (Vulpes vulpes).* I. Pantličare lisica. II. Trematode lisica. *[Helminth fauna of foxes: Cestodes and trematodes.]* — Vet. Glasn. 14, 207-209 & 271-273. [In Croat.] 3645

Of 79 wild foxes 57 were infested with *Taenia*, *Mesocestoides* and *Diphyllobothrium* species. Of 81 examined for trematodes, 37 harboured one or more of the following: *Alaria alata*, *Echinocasmus perfoliatus*, *Matagonimus yokogawai*, *Metorchis albidus*, *Pseudoamphistomum truncatum*.—E.G.

Sosipatrov, G. V. (1961). *[Diagnosis of enteritis caused by the trematode Echinocasmus perfoliatus in pigs.]* — Veterinariya, Moscow No. 5 pp. 36-39. [In Russian.] 3646

The trematode caused persistent and sometimes fatal diarrhoea in pigs in the Astrakhan region. Coprological, clinical and post-mortem diagnosis was discussed.—R.M.

Bugyaki, L. (1961). *Diagnostic de la cysticerose à l'aide de l'intradermo-réaction. [Intradermal test for cysticercus in cattle.]* — Bull. epiz. Dis. Afr. 9, 15-23. [In French. Summary in English.] 3647

Slaughter cattle were injected in the caudal fold with 0.1 ml. of *Cysticercus bovis* antigen. An oedematous reaction varying in size between that of a pea and a hen's egg appearing shortly after injection and persisting for 6-8 hours was taken to be positive. None of a group of 552 cattle free from cysticerci reacted positively. Of 167 positive cattle, 139 had cysticerci. The remaining 28 had other parasites, notably *Fasciola*. Positive reactions to the antigen were given by all of 25 cattle infested with *F. hepatica*, but free from cysticerci. The same phenomenon was reported in animals infested with *Dicrocoelium dendriticum*.

—M.G.G.

I. Gemmell, M. A. (1961). *An analysis of the incidence of hydatid cysts (Echinococcus granulosus) in domestic food animals in New*

Zealand, 1958-1959. — N.Z. vet. J. 9, 29-37. 3648

II. Gemmell, M. A. (1961). Some observations on the differences in incidences between *Echinococcus granulosus* and *Taenia hydatigena* in the livers of sheep in New Zealand. — N.Z. vet. J. 9, 40-41. [Author's summaries modified.] 3649

I. Three surveys were made in cattle, sheep and pigs. *E. granulosus* was widely distributed in domestic food animals throughout New Zealand. There was a significant increase in incidence with increasing age in all three species. Incidence varied from 0.1% in young calves to 90% in old cattle; from 3% in lambs to 90% in old sheep; from 7% in young pigs to 25% in three-year-old pigs. Incidence and number of cysts per animal were both greater in pigs than in cattle or in sheep in the younger age groups. The number of cysts per affected organ was greater in cattle than in old sheep.

The lung and the liver were about equally favoured sites, irrespective of whether the animal harboured one or more cysts.

There was no evidence of any change in the incidence of hydatid in domestic animals.

II. As cysticerci and associated gross damage were as common in the livers of young as old sheep, but in the latter the lesions were either dead cysticerci which had failed to leave the liver or healed scar tissue or pits resulting from an early infestation, it is not unreasonable to suggest that primary infestation of cysticerci produces at least a relative immunity against later infestations. This has been observed experimentally by Sweatman (1957) in Canada, who showed that an absolute resistance could be built up against superinfestation with the cystic stage of *T. hydatigena* after an initial dose of fewer than 800 ova. The same phenomenon was not observed under field conditions with *E. granulosus*, neither did early infestations with *T. hydatigena* appear to influence the incidence of *E. granulosus*.

Santiago Luque, J. M. (1960). Hallazgo de *Tetrahyridium variabile* en una gallina. [Tetrahyridium variabile in a fowl.] — An. Inst. Invest. vet., Madrid 10, 27-31. [Summaries in English, French and German.] 3650

Seventeen *Mesocestoides* larval cysts were found in a chicken.—M.G.G.

Ross, J. G. (1961). Association of detectable antibodies produced by *Haemonchus* spp.

infections in cattle, with serum globulin fractions.—Nature, Lond. 190, 1019-1020. 3651

Fractions of cattle sera containing *Haemonchus* antibody were tested for antibody content. The c.f. antibody appears to be located principally in the γ -1-globulin, and the haemagglutinating antibody in the β -globulin, mainly the β -2-globulin. There appears to be a possible association between the c.f. antibody, rises in the γ -1-fraction of the γ -globulins and the occurrence of natural immunity, whereas rises in the γ -2-fraction of the γ -globulin may be associated with acquired resistance.—M.G.G.

Armour, J., Hart, J. A. & Ross, J. G. (1961). The anthelmintic efficiency of fine particle phenothiazine against the gastro-intestinal strongyles of Nigerian zebu cattle.—Vet. Rec. 73, 485-488 & 489. [Authors' summary modified.] 3652

Field trials and critical tests were carried out with fine particle phenothiazine using doses of 110, 220 and 330 mg. per kg. body wt. The drug was highly effective against *Haemonchus* spp. at all 3 dosage rates; against *Trichostrongylus* spp. and *Oesophagostomum radiatum* at 220 and 330 mg. per kg.; and against *Bunostomum phlebotomum* at 330 mg. per kg. *Cooperia* spp. were not effectively removed at any dosage though some depression in egg laying was evident. Toxicity was observed in two animals given 330 mg. per kg. body wt. The control of helminths in Nigeria is discussed.

Parnell, I. W., Dunn, A. M. & Mackintosh, G. M. (1961). Field trials of some anthelmintics on Scottish hill ewes.—Brit. vet. J. 117, 239-255. [Authors' summary modified.] 3653

When Scottish hill gimmers and ewes were drenched with about 40 g. phenothiazine in autumn the egg-counts of "other Strongyles" were even lower than those of untreated control sheep in December and January when worm-egg counts are normally low. They rose again in mid-winter and by early spring were almost as high as those of untreated sheep. Treatment with phenothiazine in early spring reduced the worm-egg counts for a shorter time.

In these trials treatment with phenothiazine in autumn and before lambing increased fleece weights by about 5 oz., body weights of the gimmers and ewes by an average of about 2½ lb. and body weights of lambs by about 2 lb. The percentage of lambs

reared was not affected significantly.

The results did not clearly indicate the value of treatment of gimmers and ewes after lambing, but suggested that it might have an adverse effect on the body weights of their lambs at weaning.

Šibalić, S., Cvetković, L. & Nevenić, V. (1961). Prilog poznavanju štetnog delovanja želudacno-crevnih parazita na prirast jaganjaca u tovu. [Influence of gastro-intestinal helminths on weight gain in lambs.]—Vet. Glasn. 15, 373-375. [In Croat. Summary in English.] **3654**

Differences in body weight between untreated and phenothiazine-treated Merino lambs, Merino crosses and Yugoslav tsigai lambs, which had been experimentally infected with species of *haemonchus*, *ostertagia*, *trichostrongylus*, *nematodirus*, *cooperia* and *bunostomum*, were 4.85 kg., 3.34 kg. and 4.32 kg.—E.G.

Watt, J. A., Nicolson, T. B. & Macleod, N. S. M. (1961). 0,0 dimethyl 2,2,2, trichloro 1-hydroxymethyl phosphonate, 4-tert butyl-2-chlorophenyl methyl-phosphoramidate and 2-(β -methoxyethyl pyridine) in bovine *ostertagiosis*.—Vet. Rec. 73, 567-572. **3655**

These drugs are also known as trichlorphon (or Dipterex), Ruelene and methyridine (or Promintic) respectively. Field trials indicated that all three were efficient anthelmintics in cattle when species of *Ostertagia* were the principal parasites.—R.M.

Koutz, F. R. & Groves, H. F. (1961). Preliminary report on the anthelmintic properties of D.N.P. (Disophenol) on hookworms (*Ancylostoma caninum* and *Uncinaria stenocephala*) of dogs.—Speculum 14, No. 2 pp. 35-37. **3656**

Disophenol, 35 mg. per ml., administered subcutaneously at 0.1 ml./lb. body wt. to each of 12 dogs removed all the hookworms in 9 of the dogs. It was less efficient against *U. stenocephala* than against *A. caninum*. No other worms were removed by the drug.

—BRENDA M. WILSON.

Pierre, M., Euzéby, J., Malher, G. & Jeannin, A. (1961). De la connaissance du cycle biologique et des propriétés physio-pathologiques de *Dictyocaulus viviparus* à l'immunisation contre la bronchite vermineuse. [Immunization of cattle against *Dictyocaulus* viviparus.] — Bull. Soc. Sci. vét. Lyon 63, 69-81. **3657**

It is concluded that: 10,000 larvae cause a massive infestation in a calf aged 4-6 months, while 4,000 are usually insufficient; it is possible to vaccine calves aged at least 2 months with accurate dosage of X-irradiated larvae; in order to be effective the vaccine must contain at least 1,000 living larvae per dose and must be administered twice at an interval of about 1 month; the larvae do not usually cause pulmonary lesions and if any of them invade the alveolar epithelium to develop into the adult stage they do not cause serious disturbance of the animal's health; it is now possible to include calfhood vaccination in plans for lungworm control.—T.E.G.R.

Jarrett, W. F. H., Jennings, F. W., McIntyre, W. I. M., Mulligan, W. & Sharp, N. C. C. (1961). A pasture trial using 2 immunizing doses of a parasitic bronchitis vaccine.—Amer. J. vet. Res. 22, 492-495. [Authors' summary modified.] **3658**

Two groups of calves, one vaccinated twice with irradiated lungworm larvae, were grazed on a pasture on which severe parasitic bronchitis had occurred. There was a marked difference in clinical signs, faecal output of larvae, worm burden, and growth rate of vaccinated and control calves, in favour of the vaccinated.

Rodríguez H., J. E. (1958). Cyanacethidrazide en el tratamiento de la bronconeumonia verminosa de los bovinos en Venezuela. [Cyanacethidrazide in the treatment of lung-worms in cattle.]—Rev. Med. Vet. Parasit., Maracay 17, 135-166. **3659**

In Venezuela, 15 cattle with lungworm infestation were given 4 doses of cyanacethidrazide in 3 weeks. At the end of treatment larval counts in the faeces were negative in 8 animals and low in 6.—M.G.G.

Bello, T. R. (1961). Comparison of the flotation of *Metastrongylus* and *Ascaris* eggs in 3 different levitation solutions.—Amer. J. vet. Res. 22, 597-600. [Author's summary modified.] **3660**

The relative flotation ability of $MgSO_4$, sucrose, and $NaCl$ solutions at sp. gr. 1.200 for the recovery of *Metastrongylus* and *Ascaris* eggs from pig faeces was determined by a modification of the centrifugation-flotation method used by Dunn *et al.*

Saline was unsuitable for eggs of both nematodes. Sucrose solution recovered the

highest number of *Ascaris* eggs. The best agent for *Metastrengylus* and *Ascaris* eggs was $MgSO_4$ solution at sp. gr. 1.200; it apparently interfered less with the eggs than did the other solutions.

Cvetković, L. & Nevenić, V. (1960). [*Ascaris vitulorum infestation in calves.*]—Acta vet., Belgrade 10, No. 4 pp. 49-59. [In Serbian. Summary in German.]

3661

Up to 40% of calves under 4 months old on certain farms harboured *Ascaris vitulorum*. Between 12,000 and 25,000 embryonated ova were introduced through a rubber tube into the uterus of eight pregnant cows from an uninfested herd. All their offspring were found to be infested with the nematode at birth. The same experiment was done on seven infested cows, and only four of their calves were found infested at birth. Experiments in which uninfested calves of various ages were placed in contact with infested calves for three months indicated that post-natal infestation was very rare, and was apparently only possible during the first few hours after birth.—E.G.

Lýsek, H. (1961). Příspěvek k otázce patogenity škrkavky prasečí pro člověka. [*Pathogenicity of Ascaris suum for man.*]—Čsl. Epidem. Mikrobiol. Immunol. 10, 134-136. [In Czech. Summaries in English and Russian.]

3662

From two experiments in which the author infected himself experimentally with ova collected from pigs, he concluded that human and porcine strains of *A. lumbricoides* are identical species. He rejected differentiation based on host specificity, which he believed to be non-existent.—E.G.

Kiss, M. (1961). Véreosinophilia és anaemia orsóférgek fiatal német juhászkutyában. [*Eosinophilia and anaemia in ascaris-infested dogs.*]—Mag. állator. Lapja 16, 97-99. [In Hungarian. Summaries in English and Russian.]

3663

Of 60 Alsatian pups (1-6 months old) 56 were affected with ascaridiosis. Anaemia, weakness, variable appetite and accelerated respiration and heart rates were the most striking symptoms, and in five nervous symptoms were also present. P.M. examination of two that were destroyed revealed reddish exudate in the abdomen, tympanitic intestines containing 48 and 50 worms respectively, and a toxic liver. The number of eggs found in the faeces of the affected animals in each microscopic field of low power

ranged from 8-70 and was proportionate with the degree of anaemia and nervous symptoms. Haematological examinations revealed secondary toxic hypochromic anaemia in all cases. The r.b.c. count was from 2-6 million per cu. mm., haemoglobin from 20-60% and immature r.b.c., anisocytosis and polychromasia were observed. The w.b.c. count ranged between 8-30,000/cu. mm., and the percentage of eosinophile cells was 2-26%, being above 5% in 40 animals. A rise in the immature forms of w.b.c. was also noted. All these symptoms corresponded to the degree of infestation of the animals.—A. SEBESTENY.

Schaeffler, W. F. (1961). Die Invasion von fremden Wirten durch den Hundeparasiten *Toxocara canis*. [*Non-specific hosts of Toxocara canis.*]—Tierärztl. Umsch. 16, 137-144. [Summary in English.]

3664

Oral doses of 4,000-216,000 infective *Toxocara canis* ova were given to eight yearling sheep and ten lambs 2-10 days old. They were killed 2 days-12 weeks later and their organs examined for larvae and lesions. Before infection eosinophile leucocytes averaged 2.3% in yearlings and 0.7% in lambs. After infection the peak average in yearlings was 22% and in lambs 18.6%. In lambs larvae appeared within a few days in pancreas, heart, lungs, kidney, brain and muscles, in yearlings they rarely migrated beyond the liver. During the 12 weeks of observation larvae did not develop beyond the second stage and averaged 425 μ by 22 μ in size. There were no apparent clin. symptoms in spite of marked liver and lung lesions. The long survival of larvae in sheep would appear to make infection of another, carnivorous, host possible.—E.G.

Bachinskii, V. P. (1961). [*Piperazine anthelmintics against young Ascaridia nematodes in fowls.*]—Veterinariya, Moscow No. 5 pp. 44-46. [In Russian.]

3665

B. concluded that piperazine adipate or phosphate, and to a lesser extent the sulphate, was highly effective against young and adult ascarids. To kill young worms, chicks were given 0.5 g. once every 15 days during the period of exposure to infection.—R.M.

Di Giuseppe, F., Di Matteo, E., Gramenzi, F. & Restani, R. (1960). Sull'alta frequenza della filariosi canina in Abruzzo e nel Piceno. [*High incidence of filaria infestation in dogs in Central Italy.*]—Atti Soc. Ital. Sci. vet. 14,

336-339. [Summaries in English and French.] **3666**

Unspecified microfilariae were found in the blood of 30 of 124 dogs examined.

—T.E.G.R.

Chapman, N. F. & Smith, A. W. (1961).

Effects of dithiazanine iodide on *Dirofilaria immitis* in dogs.—J. Amer. vet. med. Ass. **138**, 605-607. [Authors' summary modified.] **3667**

Dithiazanine iodide did not eliminate adult *D. immitis* from dogs. It had an excellent microfilaricidal effect in dosages as low as

See also absts. 3739-3742 (carbon tetrachloride poisoning).

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

Loppnow, H. (1961). Zur Kasuistik primärer Herzumoren beim Hund (zwei Fälle von Hämangioma am rechten Herzohr). [Primary heart tumours in dogs (two cases of haemangioma of the right auricle).] — Berl. Münch. tierärztl. Wschr. **74**, 214-217. [Summary in English.] **3668**

The gross and histological findings were described in 2 cases of primary haemangioma of the right auricle in Alsatians, a 3-year-old male and an 8-year-old female. Both dogs died as a result of bleeding from the tumour into the pericardium.—M.G.G.

Guillon, J. C. & Renault, L. (1961). Apparition d'hépatomes chez des canes. [Hepatomas in ducks.]—Bull. Acad. vét. Fr. **34**, 93-97. Discussion: p. 97. **3669**

Hepatic tumours were found in 20 ducks from 8 flocks. The only symptom was a progressive decline or absence of egg production. P.M. examination revealed cirrhosis of the liver, with small benign hyperplastic adenomas, large malignant hepatomas and different intermediate stages. The tumours were studied histologically. No virus was isolated, but it was suggested that duck hepatitis virus might be the cause.—M.G.G.

Marcato, P. S. (1961). Carcinoma epatico di tipo biliare con metastasi freniche in *Equus caballus*. [Bile duct carcinoma in the liver of a horse.]—Nuova Vet. **37**, 66-69. [Summaries in English, French and German.] **3670**

A case report with photomicrographs. There were metastases in the diaphragm.

—T.E.G.R.

25 mg. per lb. body wt. for one day. It did not affect fertility of adult *D. immitis*. It appeared ineffective against migrating larval and immature adults.

Intoxication does not appear to be an important factor when 25 mg. per lb. body wt. are given for one day.

Blood testing at 6-monthly intervals, treating dogs for adult *D. immitis* infection with arsenicals, treating dogs for microfilarial infection with dithiazanine iodide, and an effective mosquito control scheme constitute the present heartworm control routine for sentry dogs in the Pacific Air Forces.

See also absts. 3739-3742 (carbon tetrachloride poisoning).

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

Helve, A. V. (1961). Über die Neurinomatose des Rindes in Finnland. Untersuchungen über Vorkommen, Symptomatologie und pathologische Anatomie der Krankheit. [Neurinomatosis of cattle in Finland.] pp. 74. Lahti: Kanervan Kirjapaino Oy. [Thesis, Helsinki.] [In German.] **3671**

This thesis gives details of work previously reported in Swedish in a more condensed form [V.B. **29**, 3895].

von Sandersleben, J. (1961). Über seltene Blastome der Spinalnerven des Hundes. [Neurosarcoma of the spinal nerves in dogs.] — Berl. Münch. tierärztl. Wschr. **74**, 176-178. [Summary in English.] **3672**

The histopathology is described of neurosarcoma of the spinal nerves, probably originating from perineural fibroblastomeres, in two male dogs three and eight years old. Both tumours had characteristics of reticulosarcoma. There were apparently no metastases. In the older dog there were also lesions indicative of virus encephalitis. There are four photomicrographs.—E.G.

Enke, K.-H., Jungnitz, M. & Rössger, M. (1961). Ein kasuistischer Beitrag zur lymphatischen Leukose des Schafes. [Lymphatic leucosis in sheep.]—Dtsch. tierärztl. Wschr. **68**, 359-364. [Summary in English.] **3673**

In a district where the incidence of bovine leucosis was high, about 40 sheep of a flock (total number not stated) developed leucosis, particularly during February, March and April. In this flock there was a history of listeriosis and stomach worm infestation. Clin. symptoms included posterior paralysis,

anaemia and dropsy with death within two weeks. In some there were leucotic swellings on the flank and near the spine. Blood samples from 65 sheep, 45 of which were in poor condition, were studied. Of the 45 about 18% had leucosis and 31% were suspected of leucosis. Of the apparently healthy group 20% were suspected and none positive. Those suspected were slaughtered and 14 were examined P.M., in seven of which gross and histological lesions, described in detail, confirmed leucosis.—E.G.

Irfan, M. (1961). *Studies on the peripheral blood picture of the dog and cat in health and disease, with special reference to lymphatic leukosis, together with observations on the pathology and drug therapy of lymphatic leukosis in dogs. I. Studies on the peripheral blood picture of the normal dog. II. Lymphatic leukosis in dogs.* — Irish vet. J. 15, 65-81 & 86-108. [Author's summaries modified.]

3674

I. Age, breed and sex differences were investigated in the blood picture of 124 dogs of 20 different breeds and 41 mongrels, all clinically normal. The haemoglobin content, red cell content and packed cell volume increased up to one year of age and thereafter remained steady (haemoglobin 17.5 g./100 ml., red cell count 6.11 millions per cu. mm.,

packed cell volume 52 ml./100 ml.). The total white cell count and lymphocyte count were higher in dogs under 2 years old (14,000 and 5,250 per cu. mm.) than in older dogs (10,500 and 1,943 per cu. mm.), but there was no significant difference in the neutrophile count (7,295 and 7,667 per cu. mm.). There were no significant age or breed differences in corpuscular values and blood sedimentation rate. The haemoglobin content, red cell count and packed cell volume were higher in Greyhounds than in other breeds.

II. A total of 137 blood examinations were made in 53 dogs with lymphatic leucosis. Two dogs had leucopenia, 18 normal leucocyte counts, 17 leucocytosis, and 16 a leukaemic blood picture. The presence of lymphoblasts was considered to be diagnostic of lymphatic leucosis. About 69% of dogs had anaemic changes; most of these were normocytic and normochromic. About 66% had increased erythrocyte sedimentation rate. Almost all the cells in smears and sections of lymph nodes were lymphoblasts. Clinical, P.M. and histological findings were described. Trials with chlorambucil, trichlorotriethylamine, and cortisone were reported. Some favourable effects of chlorambucil given by mouth were noted. Tests in lab. animals did not reveal any transmissible agent.

See also abst. 3594 (changes in respiration of chick chorio-allantoic membrane caused by bovine leucosis virus).

NUTRITIONAL AND METABOLIC DISORDERS

Horváth, I., Mészáros, I. & Kiszely, G. (1961). *Histochemische Untersuchung des Rinderendometriums. II. Die histologischen und histochemischen Veränderungen des infolge mangelhafter Fütterung verletzten Endometriums in den verschiedenen Phasen des Geschlechtszyklus. [Histochemistry of the bovine endometrium. II. Changes associated with under-feeding at different stages of the reproductive cycle.]* — Acta vet. Acad. Sci. hung. 11, 223-233. [In German.]

3675

An account in German of work previously published in Hungarian [V.B. 31, 571].—R.M.

Buchholz, V. & Lyhs, L. (1961). *Über den Einfluss kalter Nahrung auf Funktionen beim Wiederkäuer. [The influence of cold food and drinking water on certain functions in ruminants.]* — Mh. VetMed. 16, 205-208.

3676

The authors studied the influence of 3 litres of drinking water per 50 kg. body wt., of a temp. of 2°, 15° or 39°C., given freely or by stomach tube, on rectal temp., pulse and

respiration rate in cattle, sheep and goats. In winter drinking-water temperatures of 10-20°C. were recommended.—E.G.

Vermeulen, C. W., Proctor, D. L. & Seibutis, L. (1961). *Urinary calculi in rats on milk or lactose diet.* — J. Lab. clin. Med. 57, 883-893. [Authors' summary modified.]

3677

A milk diet markedly augmented stone formation in rats when a standard stimulus to stone growth, a foreign body, was placed in the urinary bladder. Urinary calcium concentration was also increased, though the intake of calcium from a milk diet was less than from a control diet. A diet containing lactose also increased the concentration of calcium in the urine, but without marked stone growth. These findings suggest that milk may contain an unknown calculogenic factor.

Keeler, R. F. & Lovelace, S. A. (1961). *The effect of urinary silicon concentration on the formation of siliceous deposits on bladder*

implants in steers. — Amer. J. vet. Res. 22, 617-619. [Authors' summary modified.] 3678

A dietary regimen for enhancing urinary silicon excretion in steers is described. The excretion level achieved was two- to threefold greater than the 70 to 80 $\mu\text{g}/\text{ml}$. level at which silicon normally precipitates in bovine urine. Steers having bladder implants and excreting as high as 189 $\mu\text{g}/\text{ml}$. of urinary silicon had no appreciable siliceous deposit on the implants after 25 to 60 days on the regimen. It is possible that high urinary silicon is not the only factor involved in the formation of siliceous calculi in cattle.

Hegyeli, A. & Szent-Györgyi, A. (1961). **Water and myotonia in goats.** — Science 133, 1011. 3679

Three myotonic goats on limited grazing were fed dry food. Water was withheld for periods of 3 to 7 days. These periods were followed by similar periods in which unrestricted amounts of water were allowed. The symptoms of stiffness disappeared completely within 3 days when water was withheld but returned completely in 2-3 days when water was given again.—E. J. CASTLE.

Curto, G. & Orsatti, G. (1960). Effetti dell'addizione di terramicina alla razione di ovaiole in fase decrescente di ovodeposizione. (Esperienze eseguite durante il periodo estivo su di un grande campione di galline). [Effect of oxytetracycline in the diet of hens during the period of diminishing egg production.]—Atti Soc. ital. Sci. vet. 14, 162-164. [Summaries in English and German.] 3680

Terramycin, at 30 mg./kg. in the diet of laying hens during the summer months, reduced the diminution in egg production; food consumption was lower.—T.E.G.R.

Broberg, G. (1960). Acute overeating with cereals in ruminants. Various aspects of the disease resulting from the consumption of excessive amounts of carbohydrate-rich feeds, including studies of lactic acid and thiamine metabolism. pp. 83. Lovisa, Finland: AB. Lovisa Nya Tryckeri. 3681

In sheep which had over-eaten on grain the lactic acid, pyruvic acid and glucose content of the blood increased. In fatal cases the pyruvic acid content exceeded 3 mg.%. Stasis of the forestomachs was noted, and the urinary excretion of thiamine was depressed. Lesions were insignificant, indicating that biochemical changes were the cause of death. Treatment should aim at reducing the high

blood content of lactic acid. Large oral doses of baker's yeast and large i/v doses of thiamine (3-4 g.) and possibly methylene blue should be given. Calcium i/v and alkali by mouth are contra-indicated.—M.G.G.

Krogh, N. (1961). Studies on alterations in the rumen fluid of sheep, especially concerning the microbial composition, when readily available carbohydrates are added to the food. III. Starch.—Acta vet. scand. 2, 103-119. [In English. Summaries in German and Norwegian. Author's summary modified.] 3682

Starch fed in excess to hay-fed sheep caused acute acid indigestion with profound alterations in the microflora of the rumen. Increase in the concentration of amylolytic streptococci, regularly observed when sucrose or lactose was given in excess, did not invariably occur in the starch experiments. The flora of lactobacilli developing on the high-starch diet differed qualitatively from that obtained when sucrose or lactose was fed.

In general, the tolerance for starch appeared to be higher than for sugars.

Creasey, W. A., Hankin, L. & Handschuhmacher, R. E. (1961). Fatty livers induced by orotic acid. I. Accumulation and metabolism of lipids.—J. biol. Chem. 236, 2064-2070. [Abst. from authors' introduction.] 3683

The fatty infiltration of the liver which accompanies the ingestion of orotic acid by rats affords a convenient system for the study of lipid metabolism. This phenomenon, unlike the development of fatty liver induced by a choline-deficient diet, does not seem to be accompanied by other serious pathological disturbances, is readily reversible and is prevented by low levels of dietary adenine.

In the present study certain changes which occur in the liver lipids during induction of fatty infiltration have been described and additional nutritional findings presented.

Demaux, G., Le Bars, H., Molle, J., Rerat, A. & Simonnet, H. (1961). Absorption des acides aminés au niveau du rumen, de l'intestin grêle et du caecum chez le mouton. [Absorption of amino acids from rumen, small intestine and caecum of sheep.]—Bull. Acad. vét. Fr. 34, 85-88. 3684

Absorption of amino-acid nitrogen was demonstrated from the perfused rumen, small intestine and caecum of sheep. The degree of absorption from the small intestine was very variable.—M.G.G.

Hartmans, J. (1960). Waarnemingen over koperverlies bij weidend jongvee in Friesland. [Copper status of young cattle grazing in Friesland.] — Jaarb. Inst. Biol. Scheik. Onderz. Landbw., Wageningen, 1960 pp. 143-154. [In Dutch. Summary in English.] 3685

Hypocupraemia occurred particularly where the soil was clay on top of peat. It was unrelated to the Ca content of pasture grasses. During the grazing season there was progressive reduction in Cu content of blood and liver biopsy samples from yearling cattle. The copper status of young cattle was improved by feeding mineral mixture which supplied amounts of Cu ranging from 200 mg. copper sulphate per head daily at one month of age to 500 mg. at one year of age. Data are presented in 4 tables, each provided with captions in English.—R.M.

Barber, R. S., Bowland, J. P., Braude, R., Mitchell, K. G. & Porter, J. W. G. (1961). Copper sulphate and copper sulphide (CuS) as supplements for growing pigs. — Brit. J. Nutr. 15, 189-197. 3686

Cu as 250 p.p.m. of the diet in the form of copper sulphide caused some improvement in the growth rate of pigs, but the improvement was much greater when the same amount of Cu was given in the form of the sulphate. It was suggested that the effect of Cu on growth is related to the amount of soluble Cu in the gut.—M.G.G.

Hawbaker, J. A., Speer, V. C., Hays, V. W. & Catron, D. V. (1961). Effect of copper sulphate and other chemotherapeutics in growing swine rations. — J. Anim. Sci. 20, 163-167. [Abst. from authors' summary.] 3687

In four trials involving 528 young pigs the findings indicated that:— (1) The optimum concentration for rapid growth rate and efficient feed conversion was 0.1% copper sulphate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$). (2) With copper sulphate plus 3-nitro-4-hydroxyphenylarsonic acid, responses were no better than with copper sulphate alone. Copper sulphate increased the faecal mould and yeast count as would an antibiotic. (3) None of the anti-fungal antibiotics (nystatin, phytoactin, phyto-streptin or rimocidin) gave further improvement in growth rate when combined with copper sulphate, and none of them depressed the faecal mould and yeast count. (4) The combination of copper sulphate and either oleandomycin or oxytetracycline appeared to give an additive effect on growth rate. The

Cu content of loin tissue from pigs fed 0.1% copper sulphate did not differ significantly from that of controls, but the Cu content of the liver increased tenfold (29 to 293 p.p.m.). Copper sulphate increased lactobacilli, total aerobes, total anaerobes and streptococci. The antibiotics increased the faecal count of coliforms and of moulds and yeasts and decreased the streptococci.

van Loen, A. & Schoenmakers, A. (1961). De invloed van de minerale samenstelling van het weiderantsoen op de voortplantingspotentie van rundvee. [Influence of some mineral constituents of the pasture on bovine fertility.] — Tijdschr. Diergeneesk. 86, 877-898. [In Dutch. Summaries in English, French and German.] 3688

Insemination results for 25 herds (538 Friesian cows) were compared with analyses of soil and herbage made in spring and in autumn. Statistical analysis failed to show any correlation between fertility and phosphorus, calcium, potassium or pH of soil or crops. The authors concluded that, to arrive at significant results, it would be necessary to analyse a series of herbage samples collected at short intervals. Composition of herbage in spring was unrelated to the composition in autumn. The 14 tables are provided with English captions.—R.M.

O'Moore, L. B. (1960). The mineral composition of pasture in relation to animal health and production. I. Hypomagnesaemia in cattle and sheep. II. Delayed breeding in cows and heifers.—Monogr. Ser. Soc. chem. Ind. No. 9 pp. 146-155 & 155-158. 3689

I. The possible factors contributing to the development of grass tetany in cattle and sheep were reviewed. These included excitement, fear, cold and wet weather, parturition, lactation, and combined application of N and K to pasture. In 25 outbreaks of grass tetany in dairy cows the Ca content of the herbage was lower than that of control herbage, but there was no significant difference in the N, P, Mg and K content. In 15 instances of tetany in outwintered cattle the N, Ca, P, Mg and K content of the herbage did not differ significantly from that of control herbage. Suggestions for the control of grass tetany included a gradual change from winter diet to spring pasture, use of old pastures with a higher clover content, application of K to pasture in early autumn and N before growth in the spring, feeding calcined magnesite, supplementation of the diet with starch, and

provision of adequate food and shelter for outwintering cattle.

II. P is the important mineral for satisfactory fertility in cattle. In Ireland delayed oestrus occurs in an occasional animal grazing pastures which contain factors interfering with the utilization of Cu; oestrus recurs within a few days of the administration of a Cu salt. No effect of Co and Mn deficiency in the herbage has been seen on the oestrous cycle of cattle in Ireland.—M.G.G.

Field, A. C. (1961). **Studies on magnesium in ruminant nutrition. 2. The effect of abrupt changes in the nature of the diet on the urinary magnesium excretion of sheep.**—*Brit. J. Nutr.* 15, 287-295.

3690

A change from hay or grass nuts to spring herbage depressed the urinary excretion of Mg in 7 of 8 wethers even when the amount of Mg ingested rose. A change of diet in the reverse direction had the opposite effect, which was again independent of the change in intake of Mg.—M.G.G.

Todd, J. R. (1961). **Magnesium in forage plants. I. Magnesium contents of different species and strains as affected by season and soil treatment. II. Magnesium distribution in grasses and clovers.**—*J. agric. Sci.* 56, 411-415 & 57, 35-38. [Author's summaries modified.]

3691

Timothy grass was consistently low in Mg, and rye-grasses and cocksfoot contained appreciably more. Clover species contained more Mg than grasses, especially in spring. Ammonium sulphate and superphosphate fertilizers slightly increased Mg contents, while dressings of calcined magnesite greatly increased Mg in grasses and clovers.

Water-soluble material extracted from fresh herbage represented about 25% of the total dry matter but contained more than half of the total Mg. Fibrous material (insoluble in acetone and water) constituted about two-thirds of the dry matter, but contained only about one-third of the total Mg. At levels of pasture Mg at which hypomagnesaemic tetany occurs in ruminants, water-soluble Mg ceases to be the largest fraction, and may be only one-third of the total.

Vitale, J. J., Hellerstein, E. E., Nakamura, M. & Lown, B. (1961). **Effects of magnesium-deficient diet upon puppies.**—*Circulat. Res.* 9, 387-394.

3692

Puppies aged 6-8 weeks, fed on a magnesium-free diet became over-irritable,

had convulsions and gained weight slowly; they died after 100-175 days. Lesions, blood composition and electrocardiographs were studied.—R.M.

Hanna, S. (1961). **Plasma magnesium in health and disease.**—*J. clin. Path.* 14, 410-414. [Author's synopsis modified.]

3693

Simpler and more accurate flame spectrophotometric techniques are now available for estimating magnesium. Because of the development of modern electrolyte therapy, human cases of hypomagnesaemia are now encountered more frequently. The condition may lead to dangerous convulsions without sufficient warning. Some causes of hypomagnesaemia and hypermagnesaemia are presented.

Smith, R. H. (1961). **Effect of the ingestion of wood shavings on magnesium and calcium utilization by milk-fed calves.**—*J. agric. Sci.* 56, 343-350.

3694

Unmuzzled milk-fed calves allowed to eat wood shavings showed a greater mean decrease in magnesium absorption than a group of muzzled calves; the results suggested that milk-fed calves will resist hypomagnesaemia for at least 5 months if prevented from chewing foreign matter. Net calcium absorption decreased with age in both groups, but to a greater extent in the unmuzzled group; the shavings therefore appeared to contain a factor which interfered with calcium utilization, possibly by inhibiting the action of vitamin D.—E.V.L.

Lueker, C. E. & Lofgreen, G. P. (1961). **Effects of intake and calcium to phosphorus ratio on absorption of these elements by sheep.**—*J. Nutr.* 74, 233-238. [Authors' summary modified.]

3695

Feeding rations containing Ca : P ratios of 0.8 : 1, 2.8 : 1 and 6 : 1 to growing lambs had no effect on the amount of calcium or phosphorus absorbed, which was directly related to the amount fed. Excretion of metabolic faecal calcium was independent of the amounts of Ca or P absorbed since it remained essentially constant on the three rations. Metabolic faecal phosphorus excretion increased as the phosphorus absorbed increased and decreased with increasing calcium absorption. The smallest excretion of metabolic faecal phosphorus occurred with the ration containing a 6 : 1 Ca : P ratio. The ratio of absorbed calcium to phosphorus with this ration was 1 : 1.

The specific activity of the phosphorus of the saliva was a good indication of the specific activity of the phosphorus of blood serum 10 days after a s/c inj. of P^{32} .

Gehle, M. H., Payne, L. C., Peo, E. R., Jr. & Marsh, C. L. (1961). *Interrelationship of growth rate, hemoglobin dilution, packed cell volume, and incidence of anemia in suckling pigs*.—*J. Amer. vet. med. Ass.* **138**, 81-84. 3696

Eighteen 'specific-pathogen-free' pigs were divided into two groups and reared in concrete pens without creep feed for 7 weeks. Group 1 received no iron until 25 days of age by which time they were showing obvious signs of anaemia. Group 2 received an injection of iron at 4·5 and 22·5 days old. Body weight and body specific gravity were recorded at intervals and blood samples taken. Group 2 grew significantly faster than group 1 and their haemoglobin levels, packed cell volume and whole blood sp. gr. were significantly higher when under 30 days old. The correlation between whole blood sp. gr. and the haemoglobin and packed cell volume levels indicates that whole blood sp. gr. could be used in field diagnosis of anaemia. Correlations between body weight and haemoglobin levels suggest that haemoglobin dilution occurs in anaemia.—E. J. CASTLE.

Schmidtke, D. & Schmidtke, H.-O. (1961). *Versuche der Diagnostik und Therapie von Kaliummangelzuständen beim Hund*. [Diagnosis and treatment of potassium deficiency in dogs.]—*Kleintier-Praxis* **6**, 94-97. 3697

Serum potassium levels in dogs with paresis, paralysis, and diarrhoea showed no relationship between these conditions and potassium deficiency. Paresis and paralysis, however, responded to i/v or s/c doses of Ringer's soln. and similar electrolyte mixtures containing potassium.—E.G.

Fojtách, Z., Koláček, M., Mašek, J. & Tománek, J. (1961). *Srdeční mrtvice prasat následkem dietní chyby*. [Fatal syncope in pigs as the result of faulty diet.]—*Veterinářství* **11**, 209-210. [In Czech.] 3698

An outbreak of fatal syncope, affecting mainly pigs in good condition and weighing about 80 kg., was described. These pigs had been on a diet of steamed potatoes and fresh beet, a little meal and no mineral supplement. The serum potassium content was 112 mg.% (normal value 27·7 mg.%), serum magnesium 5·3 mg.% (normal value 2·17 mg.%) and

organic phosphorus 26 mg.% (normal value 9 mg.%). The outbreak was associated with sodium depletion, due to the high potassium content of the ration. When sodium chloride in amounts of 4·8 g. per pig per day was added to the diet, no further cases occurred.

—E.G.

Denton, D. A. & Sabine, J. R. (1961). *The selective appetite for Na^+ shown by Na^+ -deficient sheep*.—*J. Physiol.* **157**, 97-116. 3699

A detailed account of work previously published in brief [*V.B.* **31**, 1210].—R.M.

Potter, B. J. (1961). *The renal response of sheep to prolonged ingestion of sodium chloride*.—*Aust. J. agric. Res.* **12**, 440-445. [Author's summary modified.] 3700

The renal function of sheep, after the ingestion of solutions containing 0·89% sodium chloride and 0·5% sodium sulphate; 1·14% sodium chloride and 0·2% sodium sulphate; and 1·3% sodium chloride offered as the only source of drinking water for 6 months, was compared with that of sheep fed on an identical diet and provided with rain-water.

The daily fluid intake and the quantity of urine excreted increased in proportion to the concentration of the sodium chloride ingested. The glomerular filtration rate and filtration fraction were increased in the sheep drinking the saline water, but the renal plasma flow was only slightly reduced. The observations indicate that the sheep is able to tolerate relatively high salt water by virtue of a renal adjustment which favours increased filtration and so the elimination of the ingested salt.

Skold, B. H. & Jensen, R. (1961). *Effect of naturally occurring highly mineralized water on the growth of laboratory animals*.—*Amer. J. vet. Res.* **22**, 601-605. [Authors' summary modified.] 3701

Young rabbits, mice, and g.pigs were allotted to 2 groups. For 3 months, one group received water with a high, and the other group water with a low concentration of mineral salts.

Average daily weight gains of the animals were compared.

The g.pigs whose water supply had a low mineral content gained significantly more weight daily than those in the other group; but in the rabbits and mice the differences were not significant.

Harrison, M., Fraser, R. & Mullan, B. (1961). **Calcium metabolism in osteoporosis. Acute and long-term responses to increased calcium intake.** — Lancet, May 13th, 1015-1019. [Authors' summary modified.] 3702

Recent studies of calcium metabolism do not support the widely accepted hypothesis that osteoporosis results from defective osteoblastic activity. Studies reported here suggest that calcium deficiency is an important factor in many cases of post-menopausal and senile osteoporosis. Many patients with these forms of osteoporosis absorb and retain Ca abnormally avidly when on a high-calcium intake (calcium gluconate supplements), and moreover may continue to retain it avidly for at least three and a half years. Symptoms of the disease are relieved, and no further fractures take place.

Green, J., Diplock, A. T., Bunyan, J., Edwin, E. E. & McHale, D. (1961). **Ubiquinone (coenzyme Q) and the function of vitamin E.** — Nature, Lond. 190, 318-325. 3703

The authors discussed possible functions of vitamin E, with reference to the role of ubiquinone and alpha-tocopherylquinone.

—R.M.

Leat, W. M. F. (1961). **Studies on pigs reared on diets low in tocopherol and essential fatty acids.** — Brit. J. Nutr. 15, 259-270. [Abst. from author's summary.] 3704

In these studies pigs weaned at 10 lb. were reared on a low-fat, low-tocopherol diet and slaughtered when they weighed 200 lb.

It was concluded that the major function of tocopherol in the pig is to protect body lipids from oxidation.

Kakulas, B. A. (1961). **Myopathy affecting the Rottnest quokka (Setonix brachyurus) reversed by α -tocopherol.** — Nature, Lond. 191, 402-403. 3705

Paralysis of the hind limbs in the quokka (a small marsupial) in captivity, has usually ended fatally in a few days to several weeks despite therapy including antibiotics and anthelmintics. Nine quokkas with paralysis, in captivity, were given vitamin E orally, 200 to 600 mg. over several days. All animals recovered and biopsies showed recovery from muscle degeneration.—E.V.L.

Johnson, P. C., Driscoll, T. B. & Honska, W. L. (1961). **Inhibition of vitamin B-12 absorption by bile.** — Proc. Soc. exp. Biol.,

N. Y. 106, 181-182. [Authors' summary modified.] 3706

In the intact rat, bile in the small intestine inhibits vitamin B₁₂ absorption. The inhibitory effect of bile is prevented by simultaneous addition of rat gastric juice.

I. Kolesov, A. M., Gorbelik, R. V. & Dement'ev, I. L. (1960). **[Alimentary ketonuria of pregnant sheep.]** — Trudy Saratov. zootekh.-vet. Inst. 9, 205-213. 3707

II. Dement'ev, I. L. (1960). **[Metabolism of carbohydrate and fat in pregnant ewes fed different rations and in ewes with alimentary ketonuria.]** — Ibid. 215-222. 3708

III. Babin, Y. A. & Stupak, N. F. (1960). **[Disturbances of the tricarboxylic acid cycle in metabolic disorders of pregnant ewes.]** — Ibid. 223-227. [In Russian.] 3709

I. The authors reproduced ketonuria (pregnancy toxæmia) accompanied by fatty change in the liver by feeding diets which provided a sheep with only 11.25-27.44 g. digestible protein daily. Illness developed after 15-35 days on the ration in sheep 120-130 days pregnant, and after 62-102 days in sheep 50-80 days pregnant. Supplements of carbohydrates or vitamins A and B did not prevent the condition. Changes in blood chemistry were followed. Non-pregnant sheep fed the low-protein diet became emaciated but fatty change in the liver was milder than in pregnant sheep.

II. Values for blood constituents in pregnant ewes fed a low-protein diet, with values given in brackets for pregnant ewes fed a normal diet, were as follows: glycogen 31-49 mg.% (53-69), pyruvic acid up to 4.65 mg.% (1.2-2.1), ketone bodies up to 15 mg.% (2-4).

III. Intravenous injection of sodium fluoride at 50 mg./kg. body wt. into pregnant ewes greatly increased the concentrations of pyruvic acid and acetone bodies in the blood. Ketonaemia in pregnant ewes fed a low-protein diet decreased after i/v injection of sodium citrate at 250 mg./kg. body wt.—R.M.

Imlah, P. (1961). **A study of ascorbic acid in normal and ketotic cows.** — J. comp. Path. 71, 28-43. 3710

Ascorbic acid, glucose, total acetone bodies and free acetone were estimated weekly in whole blood from 19 normal dairy cows, pre- and post-partum. There was no

significant change in ascorbic acid, glucose rose significantly at parturition and then dropped and total acetone bodies increased significantly 3 weeks post-partum. There was no evidence of abnormal ascorbic acid levels in the few cows with ketosis that were studied.

Four of five cows with ketosis treated with ascorbic acid showed only a temporary improvement. Ascorbic acid saturation tests on normal cows and cows with ketosis revealed no significant differences.

—E. J. CASTLE.

See also abst. 3828 (book, animal nutrition).

DISEASES, GENERAL

Stoddard, H. L. (1961). United Nations. Informe al gobierno del Paraguay sobre sanidad animal y lucha contra las enfermedades del ganado. [Report to the government of Paraguay on animal health and the control of diseases of livestock.] pp. 31. Rome: Food & Agriculture Organization of United Nations. (Report No. 1293.) 3711

Stoddard's mission in Paraguay, from July 1956 to October 1960, was to help in the creation and management of a central veterinary laboratory, introduce modern methods of controlling diseases and parasites of livestock, and instruct Paraguayan technicians in their diagnosis and control. This report makes recommendations on the management and finance of the central laboratory, the control of various diseases, and the creation of regional diagnostic laboratories, a commission to study problems of animal health, veterinary services for horses and poultry, a quarantine station for imported animals, and a national institute for the control of F. & M. disease. In Paraguay, 60% of the total livestock production is lost through diseases and parasites; 30% of these losses are due to F. & M. disease, types O, A and C. TB. is present in 25% of dairy cattle. Mastitis reduces the milk supply by 5-10%. At least 40% of calves and about 5% of ranch cattle die in a year. The abortion rate in ranch cattle is 30-50%; much of this is due to brucellosis. Molybdenum poisoning affects cattle in parts of the Chaco; the Mo content of the soil there is 70-150 p.p.m. and the Cu content is low.—M.G.G.

Weir, J. A. (1960). **Genetics and laboratory animal diseases.** — Proc. Anim. Care Panel 10, 177-188. [Author's abst.] 3712

Host-pathogen relations have a long evolutionary history but specific cases illustrate general principles. Species which are resistant to anthrax release from the leucocytes an anthracidal factor which prevents capsule formation by the organism. Resistance to salmonellosis in certain inbred

strains of mice is accomplished by a number of interacting elements including ability to localize, phagocytose and digest virulent organisms. Host resistance to tuberculosis in the rabbit involves localization of the organisms. Of virus diseases, ectromelia is of particular concern. Contact between different inbred lines results in a disease picture not unlike an epizootic in a mixed-bred population; the difference is that individual variation has been replaced by variation between distinct inbred lines.

Stevens, A. J. [Compiled by] (1961). **A laboratory handbook of veterinary diagnostic procedures.** pp. 70. Rome: Food and Agriculture Organization of the United Nations. Animal Health Branch Monograph No. 3. [FAO Working Document]. 3713

This handbook was compiled to aid the teaching of veterinary graduates in connexion with the establishment of a provincial veterinary laboratory service. The sections describe in note form the diagnostic techniques for different bacterial, fungal, protozoal and parasitic diseases of domestic mammals, the biochemical examination of urine, blood and milk, and some tests for poisons. There are drawings of helminth eggs and larvae.

—M.G.G.

Pierotti, P. (1960). Adenomatosis polmonare del cavallo. [Pulmonary adenomatosis in a horse.]—Atti Soc. Ital. Sci. vet. 14, 356-358. [Summaries in English and French.] 3714

Lesions of pulmonary adenomatosis in a horse were similar to those of jaagsiekte in sheep.—T.E.G.R.

Lancz, E. (1961). Ló csüdekcémájának gyógykezelése Dermosaly-lal. [Dermosaly ointment for treatment of eczema of the fetlock in horses.]—Mag. állator. Lapja 16, 93-97. [In Hungarian. Summaries in English and Russian.] 3715

The author employed the mixture of salicylic acid, boric acid and carbolic acid in a proportion of 5:3:2 suggested by Roth

[*Mh. VetMed.* **9**, 317 (1954)] for the treatment of fetlock eczema (mud rash, mud fever, cracked heels). In 17 cases the above mixture alone (SBC), for 10 cases the above components together with liquid paraffin and yellow vaseline in a proportion of 5:3:2:2:2 ("Dermosalyl", Phylaxia) were used. After 3-5 topical applications at 5 days intervals 26 out of the 27 treated animals were improved or completely cured although some cases were very advanced with abundant verrucous outgrowths and pus formation. The aetiology is discussed, and the history and treatment of three cases described in detail.—A. SEBESTENY.

Müller, M., Liebermann, H. & Heinke, I. (1961). Durchführung und Ergebnisse des Bullengesundheitsdienstes in Mecklenburg. [The health service for bulls in Mecklenburg.] —Zuchthyg. FortpflStörung. u. Besamung **5**, 115-122. [Summaries in English and Russian.] **3716**

Of 1,575 stud bulls examined 141 were rejected, the reasons listed including faulty semen, brucellosis, orchitis, epididymitis, lack of libido, inflammatory lesions of penis, prepuce and accessory glands, viciousness, etc. Of 37 bulls with non-specific balanoposthitis, 29 responded to treatment. Details are given of the general condition of the bulls, housing, management, keeping of records, bacteriological and serological studies and evaluation of semen.—E.G.

Gardiner, M. R. (1961). Metastatic calcification associated with white muscle disease in lambs.—J. Amer. vet. med. Ass. **138**, 553-556. [Author's summary modified.] **3717**

White muscle disease in lambs is a newly recognized disease in Western Australia. G. discussed the possible precipitating effect of an anthelmintic drench containing arsenic, copper, and carbon tetrachloride, and to the concomitant occurrence of renal damage and classical metastatic calcification. The relationship of known and unknown factors involved in these pathological entities is outlined.

Rac, R. (1961). Infectious rhinitis in pigs. Laboratory aspects.—Aust. vet. J. **37**, 91-93. [Author's summary modified.] **3718**

Infectious rhinitis histologically shows a characteristic pattern in the mucous membrane of the turbinate bones. In most cases examined no inclusion bodies were seen, but characteristic changes of varying intensity were present. The appearance of inclusion

bodies in a day-old piglet indicates the possibility of intra-uterine infection. The mother of this pig appeared normal and had no history of illness.

Stubenrauch, L. (1961). Zur Behandlung der russartigen Dermatose der Saugferkel mit Glukokortikoiden. [Treatment of eczema in sucking pigs with gluco-corticoids.]—Wien. tierärztl. Mschr. **48**, 277-281. [Summaries in English, French and Italian.] **3719**

Eczema in piglets 3 days to 3 weeks old, of uncertain aetiology but believed to have allergic associations, responded in its early stages to a single oral dose of 2.5 mg. or an i/m dose of 0.5 ml. of prednisolone. In severe or neglected cases doses were repeated and treatment was combined with vitamin A, D and E therapy.—E.G.

Edwards, B. L. (1961). Oedema in newborn pigs.—Vet. Rec. **73**, 540-543. [Author's summary modified.] **3720**

The results of the P.M. examination of 590 piglets less than 10 days of age are analysed. Of these, 479 were born alive, and a firm diagnosis was reached in only 145. Examination of 372 new-born piglets for subcutaneous oedema revealed 114. The overall mortality rate among the litter mates was 54.5% in cases where very oedematous pigs were found, against 33.2% where specimens were slightly oedematous. A relation is shown between subcutaneous oedema and lack of milk in the stomach at autopsy. The significance of these findings in relation to neonatal hypoproteinaemia, and possible lines of treatment and prophylaxis are discussed.

Schulz, L.-C. (1961). Experimentelle Untersuchungen zur Pathogenese shockartiger und rheumatoider Krankheiten des Schweines. II. Rheumatoide Erkrankungen und die Beteiligung des zentralen Nervensystems. III. Permeabilitätsstörungen an praeterminalen Gefäßen des Schweines und ihre Beziehungen zur Gewebeeosinophilie. [Pathogenesis of shock-like and rheumatoid diseases of pigs. II. Rheumatoid diseases involving the central nervous system. III. Disturbances in the permeability of vessels and relation to tissue eosinophilia.]—Dtsch. tierärztl. Wschr. **68**, 322-329 & 353-359. [Summaries in English.] **3721**

I/v injection of *Shigella flexneri* toxin produced a shock-like condition, characterized by an immediate reduction in heart rate and skin temperature, and cyanosis, particularly of

the ears in three pigs, weighing 20–50 kg. Injection i/v of eight pigs with swine erysipelas bacilli produced a rheumatoid syndrome, not unlike that in man. Apart from joints, heart and skeletal muscles, kidneys, lungs and the c.n.s. may be affected. Production of cerebro-spinal fluid was increased, there was subarachnoid sclerosis, resulting in hydromyelia and proliferative processes in the ependyma and infiltration of fluid into the grey substance of the cord. In one pig lesions resembled those of spontaneous poliomyelomalacia.

Both shock and the rheumatoid syndrome are characterized by disturbances in vascular permeability, particularly in the preterminal vessels. In both syndromes, arachnoid and sulco-commissural vessels of the cord are affected by permeability disturbances. Stress produces in pigs migration of eosinophile leucocytes towards peripheral tissues. Their presence is therefore, not diagnostic of allergic states.—E.G.

Durand, M. (1961). Note sur l'hépato-néphrite hémorragique du chien berger en Tunisie. [Haemorrhagic hepato-nephritis of sheep-dogs in Tunisia.]—Arch. Inst. Pasteur Tunis 38, 33-50. [Summary in English.] 3722

The disease affects dogs of European breeds, causing high mortality, and is characterized by haemorrhages (mainly epistaxis), anaemia, fever and pains in the liver and kidney regions. As a rule, bleeding time is prolonged and thrombocytopenia an important feature. Serological examinations excluded leishmania, leptospira and other bacteria, and a virus (other than hepatitis or distemper virus) is suspected, though culture on chick embryos was not achieved. Recovery followed treatment with chlortetracycline but there were frequent relapses. [P.M. findings not given.]—T.E.G.R.

Lapin, B. A. & Yakovleva, L. A. (1960). [Outlines of comparative pathology in monkeys.] pp. 303. Moscow: Gosud. izdatel'stvo meditsinskoi literatury. [In Russian.] 3723

This monograph is based largely on the authors' own experiences of rearing laboratory monkeys at Sukhumi in the Crimea, but the literature has also been consulted and there are 7 pages of Russian and of non-Russian references. The section on infectious diseases comprises dysentery, *Proteus morganii* infection, paratyphoid, gastritis, bezoars, pneumonia, bronchopneumonia, croupous

pneumonia, tuberculosis, poliomyelitis, and parasitic diseases.

Non-infectious diseases comprise diseases of the cardiovascular and blood-forming systems, neoplasms, diseases of female genital organs, pathology of pregnancy and parturition, errors of development and malformations, cholecystitis, rickets. There are many illustrations [not of the best quality] and figures for the incidence of various conditions at Sukhumi are given.—R.M.

Gordon, R. F. (1961). Some diseases associated with changes in the structure of the poultry industry.—Poult. Rev. 1, 10-20. 3724

In fowl carcasses sent to the Houghton Poultry Research Station in 1959–60, nearly 50% of the mortality from disease was due to the avian leucosis complex and fowl paralysis, and 26% to coccidiosis. In chicks coccidiosis was the commonest disease, followed by encephalomyelitis, and salmonellosis. The different diseases that affect broilers reared under intensive conditions in Gt. Britain were described.—M.G.G.

Rigdon, R. H. (1961). Spontaneous muscular dystrophy in the white Pekin duck.—Amer. J. Path. 39, 27-40. 3725

R. described the lesions in the muscular dystrophy previously reported by him [V.B. 31, 3048]. There are four plates of photomicrographs.—R.M.

Kokurichev, P. I. & Legantseva, V. I. (1961). [Muscular dystrophy in ducks.]—Veterinariya, Moscow No. 5 pp. 66-70. [In Russian.] 3726

On a duck farm 8,000 of 13,000 ducklings died from muscular dystrophy at 2–4 weeks of age. Pathological features were described.—R.M.

Beer, J. Z., Niewiarowski, S., Rosiek, O. & Kowalski, E. (1961). Dysproteinæmia after injection of ^{131}I -labelled fibrinogen into dogs.—Bull. Acad. polon. Sci., Ser. Biol. 9, 109-111. [In English.] 3727

Six hours after i/v injection of fibrinogen labelled with ^{131}I into 2 dogs, 36% of the radioactivity in the blood plasma was found in the fibrinogen fraction, 56% in the γ -globulin fraction, and 8% in the α and β globulins. The results were confirmed by incubation of dog plasma with labelled fibrinogen. It was suggested that in states of enhanced fibrinolysis, the accumulation of

digestion products of fibrinogen may be a contributory factor in dysproteinæmia.—M.G.G.

Colombo, S. (1960). I microaneurismi delle cavità auricolari nel cuore del vitello. [Aneurysms in the auricular cavity of the heart in calves.]—Atti Soc. ital. Sci. vet. 14, 371-375. [Summaries in English and German.] 3728

Microaneurysms, described as multiple cyst-like swellings on the auricular wall (especially along the free border) communicating with the auricular cavity, were observed in 250 of 3,043 slaughter calves aged 2-3 months. Another 1,707 calves had minute protrusions that might have been the initial stages of aneurysms. Lesions were commoner in males than in females.

—T.E.G.R.

Ricca, M. (1960). Contributo alla conoscenza delle alterazioni a carattere arteriosclerotico della aorta del suino. [Arteriosclerosis of the aorta in pigs.]—Atti Soc. ital. Sci. vet. 14, 346-349. [Summaries in English and French.] 3729

Studies were made on the aortic arch and the thoracic (but not the abdominal) section of the aorta of 150 pigs, aged 5 months to 4 years, of various breeds and of either sex. Nodular or plaque-like lesions were observed on the surface of the intima of 13 pigs. There were corresponding histological changes—tissue proliferation and deposition of fat and calcium in the intima, the elastic layer and, less frequently, in the media. Affected pigs were between 6 months and 4 years of age.

—T.E.G.R.

Iizuka, M. (1961). [False positive reactions to the alcohol test for lactic acid in milk. I. Field survey. II. Influence of liver disorders in cows.]—Bull. Nat. Inst. Anim. Hlth, Tokyo No. 41 pp. 81-96 & 97-113. [In Japanese. Summaries in English.] 3730

Milk of normal acidity but positive to the alcohol test was found, on an average, in 27.9% of cows in 2 prefectures in Japan; the incidence was highest in the spring and summer. Over half of the animals yielding such milk had liver dysfunction and/or mastitis whilst up to 22% had osteomalacia, fascioliasis, ketonuria, reproductive disorders or gastro-intestinal diseases. There was a positive correlation between this type of milk and pregnancy. Coagulation of such milk was found to be associated with a high ionized calcium content.—A. ACKROYD.

Setchell, B. P. & Blanch, E. (1961). A test of kidney and liver function in wethers.—Aust. J. agric. Res. 12, 446-451. [Authors' summary modified.] 3731

Para-aminohippurate (PAH) and *para*-aminobenzoate (PAB) were estimated in plasma and urine from wethers after s/c inj. of PAB. The rate of synthesis of PAH from injected PAB was taken as a measure of liver function and the rate of urinary excretion of the synthesized PAH as a measure of kidney function. Extrahepatic synthesis of PAH from PAB was unlikely to interfere with these tests. Some values for normal animals were given.

Fankhauser, R. (1961). Sporadische Meningo-Encephalomyelitis beim Rind. [Sporadic meningo-encephalomyelitis in cattle.]—Schweiz. Arch. Tierheilk. 103, 225-235. [Summaries in English, French and Italian.] 3732

A sporadic meningo-encephalitis, probably of virus origin, was diagnosed in 21 of 635 cattle in Switzerland. The condition was neither pathologically nor clinically related to bovine malignant catarrh or to the disease known in America as sporadic bovine encephalomyelitis. Clinical symptoms included dulness, sexual indifference (in a bull), fright, rage, facial paresis, salivation, abnormal carriage of head and ears, abnormal stance and gait, muscular spasms, lack of co-ordination, etc. Macroscopic brain lesions were non-specific. In the c.n.s. the disease was characterized histologically by vascular infiltrations, glia proliferation and damage to the parenchyma.—E.G.

Engel, W. K. (1961). Muscle target fibres, a newly recognized sign of denervation.—Nature, Lond. 191, 389-390. 3733

The name 'target fibre' is derived from the appearance on cross-section, each fibre so affected has 3 more or less distinct concentric zones; the histochemistry of each zone and of the target fibres is described in detail. The target fibre represents a pathological alteration of the cyto-architecture of the human skeletal muscle fibre which has been found only in association with denervation.—E.V.L.

Vogel, F. S. & Evans, J. W. (1961). Morphologic alterations produced by copper in neural tissues with consideration of the role of the metal in the pathogenesis of Wilson's

disease. — *J. exp. Med.* **113**, 997-1004.
[Authors' summary modified.] **3734**

The injection into the cerebrospinal fluid of cats of 52 to 208 µg. of copper as an albumin complex or as cupric sulphate, was followed by small increases in copper in the neural tissues, but regularly and promptly produced persistent quadriplegia and conspicuous histological changes. Smaller amounts of copper caused less, or no, neurological manifestations or histological changes.

Early lesions were non-inflammatory hydropic swellings of the myelin sheaths. They progressed rapidly to focal necrosis of all parenchymal components with marked degeneration of myelin and axis cylinders in the peripheral margins of the spinal cord, brain stem, mid-brain, and cerebrum. These histological changes did not occur in neural tissues incubated in solutions of the copper-albumin complex. They did not appear in animals injected intraventricularly with ferric sulphate or saccharated iron. Thus copper in concentrations comparable to those present in the neural tissues of patients with Wilson's disease can profoundly alter neural function and can cause conspicuous morphological changes.

See also absts. 3827 (book, veterinary pathology); 3829 (book, poultry diseases); 3832 (book, sheep husbandry and diseases).

POISONS AND POISONING

Cater, D. B. & Peters, R. A. (1961). The occurrence of renal changes, resembling nephrosis, in rats poisoned with fluorocitrate. — *Brit. J. exp. Path.* **42**, 278-289. [Authors' summary modified.] **3737**

The kidneys of rats dying 2 hours after 60 or 80 mg./kg. fluorocitrate i/p showed degeneration of the mitochondria in the cells of the proximal convoluted tubules with blockage of the tubules and distension of Bowman's capsule with fluid.

In rats killed, or dying, after 2 or more daily or alternate-day doses, marked fatty change was observed in the cells of the proximal convoluted tubules, together with degeneration and loss of tubular cells. Rats dying in this group showed fatty degeneration in the walls of the arcuate, interlobular and glomerular arteries. The histological picture resembled that found in the kidneys of patients dying with lipoid nephrosis. Similar changes were found in hepatoma-bearing rats treated with fluorocitrate, but not in the kidneys of hepatoma-bearing rats injected

Omar, A. R. (1960). A preliminary report on osteodystrophia fibrosa in goats in Malaya. — *J. Malay. vet. med. Ass.* **3**, 33-34. [In English.] **3735**

This is the first report of this condition in goats in Malaya. The Ca content of the blood serum of 4 affected goats ranged from 7.81 to 9.22 mg.%. They were fed a ration consisting of 10% rice bran, 30% maize, 30% coconut cake, and 30% sesame cake. — M.G.G.

Sørensen, P. H. & Horváth, Z. (1961). Schilddrüsen-Funktionsprüfungen mit I^{131} an Schweinen. I. Fragen der Methodik. II. Ausmass und Stabilität der unter Kälte-wirkung eintretenden Veränderungen in der Schilddrüsenfunktion. [Radio-iodine test for thyroid function in pigs.] — *Acta vet. Acad. Sci. hung.* **11**, 163-171 & 173-178. [In German.] **3736**

In part I the technique of the method is described. Part II is a German version of a paper already published in Hungarian, concerning the influence of cold on thyroid function [V.B. **31**, 558]. — R.M.

with saline, fluoro-oleic acid, or 1-deoxy-1-fluoroglycerol.

Fluorocitrate produces a specific block in the citric acid cycle at the aconitase stage. The various known causes of nephrosis in rats are discussed in relation to their action as mitochondrial poisons.

Rich, C. & Ensinck, J. (1961). Effect of sodium fluoride on calcium metabolism of human beings. — *Nature, Lond.* **191**, 184-185. **3738**

Six patients with osteoporosis and one with Paget's disease given sodium fluoride orally responded by a positive change in calcium balance and a decreased rate of excretion of calcium; other significant changes were increased alkaline phosphatase activity in plasma, decreased rate of excretion of citrate, and accelerated excretion of acid mucopolysaccharides in urine. There was no significant alteration of concentration in plasma of calcium, phosphorus or citrate.

— E.V.L.

Gallagher, C. H. (1961). **The pathology and prophylaxis of poisoning by carbon tetrachloride.** — Aust. vet. J. 37, 131-134. [Author's summary modified.] 3739

Recent investigations into the pathology and prophylaxis of poisoning of rats and sheep by carbon tetrachloride are discussed.

The lipid solvent action of CCl_4 initially damages cell structure. Especially important is the effect on the lipoprotein semi-permeable membranes leading to the loss of essential materials from the cell, and from intracellular compartments. Liver cells begin to lose cytoplasmic constituents within 1-3 hours of administering CCl_4 . Later, at about 10 hours after dosing, mitochondrial components are lost. Cell death follows the failure of respiration consequent upon the loss of essential co-enzymes, the pyridine nucleotides, from mitochondria.

Two effective methods of prophylaxis have been developed: (1) stimulating the synthesis of pyridine nucleotides by administration of the precursors nicotinic acid or tryptophane, to permit the rapid replacement of lost co-enzymes; (2) preventing the loss of pyridine nucleotides from mitochondria by inhibiting the secondary reaction leading to such loss—a number of antioxidants have been successfully used in this approach including the antihistamine phenergan, vitamin E, selenium and diphenyl-p-phenylenediamine.

The varying susceptibility of sheep to CCl_4 poisoning is discussed with relevance to experimental studies.

Rees, K. R. & Spector, W. G. (1961). **Reversible nature of liver cell damage due to carbon tetrachloride as demonstrated by the use of phenergan.** — Nature, Lond. 190, 821-822. 3740

If rats dosed with carbon tetrachloride were given promethazine hydrochloride at the same time and also 6 hours later, hepatic enzymes appeared in the blood 24 hours after dosing, and by 48 hours there was liver necrosis similar to that in rats not treated with promethazine. But if the rats received additional treatment with promethazine 24-48 hours after poisoning, the liver necrosis and release of hepatic enzymes into the blood were prevented almost completely, and even at 72 hours these changes were not observed. It was suggested that carbon tetrachloride damages irreversibly a reaction that is not of immediate importance for the life of the cell,

and that the continued presence of promethazine prevents a secondary disturbance, thus allowing the damaged system to recuperate.

—M.G.G.

Kondos, A. C. & McClymont, G. L. (1961). **Pharmacology and toxicology of carbon tetrachloride in the sheep. I. Blood levels following ruminal, abomasal, and intramuscular administration.** — Aust. J. agric. Res. 12, 433-439. [Authors' summary modified.] 3741

Doses of 8 ml. of the drug were given. Absorption was most rapid with ruminal administration, slowest with intramuscular, and intermediate with abomasal administration. Peak levels in the blood of around 15 to 20 μ g. per ml. were reached, with ruminal and abomasal administration, in about 15-30 min. and 60-120 min. respectively. With intramuscular administration the peak (10 μ g./ml.) was reached at about 4 hr. Undetectable levels, less than 5 μ g./ml., were reached in about 4-5 hr with ruminal administration, 6-7 hr with abomasal administration, and 10 hr with intramuscular injection. Carbon tetrachloride could be detected in the expired air within 5 min. of administration and up to 40-60 hr after.

Blood levels were not appreciably affected by method of administration—whether in the pure state or in liquid paraffin, or by fasting for 48 hr, and fat sheep had lower levels and a longer period of excretion than animals in poorer condition.

Smuckler, E. A., Iseri, O. A. & Benditt, E. P. (1961). **Studies on carbon tetrachloride intoxication. I. The effect of carbon tetrachloride on incorporation of labelled amino acids into plasma proteins.** — Biochem. Biophys. Res. Commun. 5, 270-275. [Authors' summary modified.] 3742

The earliest discernible change in liver cells of carbon tetrachloride poisoned rats is in the endoplasmic reticulum. Associated with this is severe depression in synthesis of fibrinogen and albumin by the liver. Lipid deposition, mitochondrial changes, and necrosis, which follow later, may all be dependent upon the defect in protein metabolism.

Collet, P. & Bacquès, C. (1961). **Essais toxicologiques de deux nouveaux raticides anticoagulants de synthèse. [Chronic toxicity for pigs, dogs and cats of two new synthetic anticoagulants for rodent control, LM 83 and**

LM 91.]—Bull. Soc. Sci. vét. Lyon **63**, 83-102. **3743**

It is considered that "Coumafène" (Warfarin) is more toxic for domestic animals than either "LM91" (para chlorophenyl 1¹ phenyl 1¹) acetyl 2 indane dione 1-3 or "LM83"—(para bromophenyl 1¹ phenyl 1¹) acetyl 2 indane dione 1-3. This difference is even more marked in acute poisoning. Pigs are more susceptible than either dogs or cats. LM83 is more toxic than LM91. Microscopic lesions are much less marked than the macroscopic lesions would lead one to expect.

Coumafène caused abundant and generalized intramuscular haemorrhages, while LM91 and LM83 caused only localized peritoneal and pericardial haemorrhages. The liver is the only organ which is really affected. Coumafène causes fatty degeneration (nutmeg liver); this lesion is not constantly found with either of the other two poisons, whence the possibility of healing after medicinal treatment in the case of LM91 or LM83. Lesions from Coumafène are reputed to be irreversible.

—T.E.G.R.

Schipper, I. A. (1961). **Toxicity of wood preservatives for swine.**—Amer. J. vet. Res. **22**, 401-405. [Author's summary modified.] **3744**

Wood preservatives containing pentachlorophenol (PCP) or creosote may be extremely toxic to young pigs. The degree of toxicity lessens as the pigs become older.

Toxicosis is particularly evident in pigs having extended direct contact with fresh over-treated timber. Liberal amounts of bedding help to prevent the condition.

Wood preservatives containing PCP or creosote, when properly applied to wood which is thoroughly dried, appear to have little or no toxicity for pigs.

Karasek, E. (1961). Intoxikationen durch ausgekeimten Roggen in einer Schafherde. [Poisoning of sheep due to sprouting rye.]—Mh. VetMed. **16**, 265-266. **3745**

Almost all of 250 sheep developed apathy, inappetence, stiffness, and gnashing of the teeth 24 hours after grazing in a stubble field containing ears of sprouting rye; 21 died, the rest recovered.—M.G.G.

Green, C. R. & Christie, G. S. (1961). **Malformations in foetal rats induced by the pyrrolizidine alkaloid, heliotrine.**—Brit. J.

exp. Path. **62**, 369-378. [Authors' summary modified.] **3746**

Malformations in foetal rats were observed, for the first time, to follow single i/p inj. of heliotrine into the mother, chiefly during the second week of gestation. Abnormalities increased in frequency and severity as concentrations of the alkaloid were raised. Common anomalies were general retardation of development and musculoskeletal defects involving especially the ribs. At high concentrations, hypoplasia of the lower jaw, indistinguishable from that produced by irradiation, was observed. In its severest forms, this was accompanied by cleft palate and other anomalies.

Oelrichs, P. B. & McEwan, T. (1961). **Isolation of the toxic principle in Acacia georginae.**—Nature, Lond. **190**, 808-809. **3747**

The toxic factor in seeds of *A. georginae* was identified as the fluoracetate ion. Symptoms identical to those of *A. georginae* poisoning were produced in lab. animals and sheep with potassium fluoracetate in quantities comparable with those found in the seeds.

—M.G.G.

Graham, J. M. & Cartridge, M. E. A. (1961). **Tutu poisoning in dogs.**—N.Z. vet. J. **9**, 45. **3748**

Two dogs which fed on the ruminal contents of a lamb that had died showed signs of disturbance of the c.n.s. Leaves and flowers of *Coriaria arborea* were found in the ruminal contents of the lamb, and the alkaloid tutin was demonstrated in vomitus from the dogs.—M.G.G.

Valeri, H. & Colvee M., P. (1960). **Colinesterasas en vacunos (Bos taurus) tratados con insecticidas fosforados.** [Cholinesterases in cattle treated with organic phosphorus insecticides.]—Bol. Inst. Invest. vet. Maracay **12**, No. 27 pp. 95-131. **3749**

Six bull calves weighing 70-130 kg. were each given one dose of 40 mg./kg. methyl butyl-tert-chlorophenylmethyl phosphoramidate. A seventh was the control. Before administration and at intervals afterwards the following were determined in blood: true cholinesterase in erythrocytes, false cholinesterase in serum, erythrocyte count and sedimentation, corpuscular volume, haemoglobin content. The results are presented in 18 tables and 3 graphs.—R.M.

PHARMACOLOGY AND GENERAL THERAPEUTICS

(For treatment of specific infections see under the appropriate disease)

Dawson, D. J. & Feagan, J. T. (1960). **The use of Brilliant Blue F.C.F. in intramammary penicillin preparations.** — Aust. J. Dairy Tech. 15, 160-172. [Authors' summary modified.] **3750**

Investigations were carried out to find a suitable dye to use in intramammary penicillin preparations. Fluorescein dyes were unsuitable. A food dye, Brilliant Blue F.C.F., was found to have suitable properties. It could be detected at 0.25 p.p.m. in milk.

Various ointment bases were examined. Preparations were satisfactorily dyed using 0.125 g. of Brilliant Blue per 100,000 i.u. of penicillin in a paraffin base. The dye and the penicillin concentrations excreted at each milking were closely related and disappeared from the milk at the same time. The use of water-repellent bases caused extended excretion of dyed milk. The penicillin in dyed preparations did not lose potency on storage. The dye did not irritate the udder.

Groth, W. (1961). **Histologisch-physiologische Untersuchungen an endokrinen Drüsen und am Magen-Darm-Kanal im Hinblick auf den Wirkungsmechanismus der Antibiotikafütterung beim Tier.** [Histology and physiology of endocrine glands and digestive system in rats and chicks fed antibiotics.] — Arch. exp. VetMed. 15, 30-73. **3751**

From experiments with 146 chicks and 108 rats it was concluded that penicillin and chlortetracycline stimulated growth, food

See also absts. 3474 (isoniazid in TB); 3498 (resistance of salmonella to chloramphenicol and tetracyclines); 3526 (cortisone in L. pomona infection of g.pigs); 3580 (treatment of vibriosis in bulls); 3537 (bactericidal action of antibiotics combined with colistin); 3539 (mastitis in cows following oxytetracycline treatment); 3556 (trypanosomiasis); 3557 (trichomoniasis); 3561 (coccidiosis); 3564 (theileriasis); 3569 (F. & M. disease); 3641, 3652-3653, 3655-3659, 3665, 3667 & 3739-3742 (anthelmintics); 3719 (eczema in piglets treated with gluco-corticoids).

PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY

Pichaicharnarong, A. (1960). **A study of climate effects on the cardiovascular system, respiratory system, and body temperature of cattle.** — Dissertation, Cornell pp. 159. Abst. from Diss. Abstr. 21, 1614-1515. **3754**

In Holstein and Guernsey calves there was no significant change in the cardiac output at environmental temperatures of 60°, 50°, and 32°F., except for increases during the early exposure to temperatures of 50° and 32°F. and during the last two hours of the total four-hour exposure time at 32°F. Experiments on the effects of high and low

conversion, and activity of the thyroid gland and adrenal cortex. There was a slight reduction in weight of thymus, small intestine and caecum; pH values of contents of the small intestine were not affected. Those of stomach and caecal contents varied. Functional hypertrophy of the intestinal mucosa was observed.—E.G.

Silvestri G., R. (1958). **Usos de la hialuronidasa en medicina veterinaria.** [Veterinary uses of hyaluronidase.] — Rev. Med. Vet. Parasit., Maracay 17, 75-120. **3752**

An account of the successful treatment of foot rot in 8 cattle with local injections of hyaluronidase and antibiotics and of experimental trypanosomiasis in 3 horses with s/c injections of hyaluronidase and 10% suramin sodium.—M.G.G.

Juszkiewicz, T. & Jones, L. M. (1961). **The effects of chlorpromazine on heat stress in pigs.** — Amer. J. vet. Res. 22, 553-557. [Authors' summary modified.] **3753**

Young pigs weighing about 27 kg. were used. Half of the non-medicated pigs, exposed to 40°C. and relative humidity of 54%, died within 2 hours and 10 min.; the survival rate of pigs previously given chlorpromazine intramuscularly (3 mg./kg.) was 90%. The surviving medicated animals lost less weight, had lower mean body temperatures and higher levels of adrenal ascorbic acid as compared with the controls.

humidities on cardiac output were generally inconclusive.

Hayman, R. H. & Nay, T. (1961). **Observations on hair growth and shedding in cattle.** — Aust. J. agric. Res. 12, 513-527. [Authors' summary modified.] **3755**

On three occasions from 1948-1956 observations were made on coat shedding in *B. indicus*, *B. indicus* × *B. taurus* cattle. Measurements of hair length, diameter, and weight per unit area of skin were made, and stages of hair growth within the follicle

observed.

Two shedding periods were observed, in spring and in autumn. Histological data showed that during shedding almost all mature hairs were lost from the skin follicles.

All types of cattle had characteristically short, light summer coats and long, heavy winter coats. No difference in hair diameter was observed between summer and winter coats in *B. taurus*, but in *B. indicus* hair diameter was much greater in the summer coat. In all seasons *B. indicus* had the shorter and lighter coats. The winter coat in long-coated *B. taurus* did not appear to have an undercoat, whereas short-coated *B. taurus* and *B. indicus* had distinct undercoats. In *B. indicus* \times *B. taurus* F_1 crossbreds coats were as short in summer as those of *B. indicus*, and as long in winter as those of *B. taurus*. Differences between species in shedding, and in coat characteristics at different seasons of the year, may be of ecological importance.

Berman, A. & Volcani, R. (1961). **Seasonal and regional variations in coat characteristics of dairy cattle.**—Aust. J. agric. Res. 12, 528-538. [Abst. from authors' summary.] 3756

Coat growth and shedding were investigated in Holstein and Syrian \times Holstein cattle in three climatic regions of Israel. The mean annual temperatures of the regions were 23°, 20.4°, and 17.5°C.

Hair quantity, coat thickness, and hair diameter were tested monthly on an area of 100 sq. cm. on the thigh; 541 samples were taken during one year.

An annual cycle was observed in these three factors. Day length and, apparently, air temperature influenced the cycle of hair quantity and coat thickness. Hair diameter was influenced only by variations in day length.

Wilson, P. N. (1961). **The grazing behaviour and free-water intake of East African short-horned zebu heifers at Serere, Uganda.**—J. agric. Sci. 56, 351-364. 3757

The behaviour of 20 zebu heifers was observed for 3 days in the dry season and for 3 days in the "transitional" season between the short rains and the dry season. In 24 hours in the transitional season they grazed 8.6 hr. in 2 day periods and one period at night; 7 hr. were spent ruminating. In the dry season 7.8 hr. grazing in 4 periods, one of which was at night, and 6.5 hr. ruminating.

On average 2 hr. were spent grazing at night, in both seasons. Drinking was usually mid-morning and early afternoon in both seasons, the intake approximately 2½ gal. in the transitional season and 4½ gal. in the dry season. The animals had no access to mineral licks and earth-licking was common, though individual times spent licking varied greatly.

—E.V.L.

Horrocks, D. & Phillips, G. D. (1961). **Factors affecting the water and food intakes of European and zebu-type cattle.**—J. agric. Sci. 56, 379-381. [Authors' summary modified.] 3758

The water and food intakes of 16 grade Shorthorn and Boran zebu steers were studied.

The water requirements of Shorthorn and Boran cattle differed.

Modest supplementation with salt, of an otherwise sodium deficient diet, had no significant effect on either water or food consumption.

Differences in environmental temperatures are suggested to explain the higher intake of water in one of the experimental periods. The increased water intake for the Borans was less than half that for the Shorthorns, only the increase for the latter being significant.

Steiner, J. W. & Carruthers, J. S. (1961). **Studies on the fine structure of the terminal branches of the biliary tree. I. The morphology of normal bile canaliculi, bile pre-ductules (ducts of Hering) and bile ductules.**—Amer. J. Path. 38, 639-649. [Authors' summary modified.] 3759

The fine structure of the ultimate and penultimate branches of the biliary tree was examined in normal dogs, rats, rabbits and in human liver biopsy tissue. The course of biliary pathways was traced from bile canaliculi of the lobules through bile pre-ductules (canals of Hering) in portal tracts to bile ductules. Canaliculi were shown to be formed by focal separation of the limiting membranes of parenchymal liver cells, and pre-ductules in a similar fashion by biliary epithelial cells. Ductules were defined as the first passages which are lined by biliary epithelium in a rosette-like formation where entire cell walls form the lumen boundary. This study is to be a basis for investigations of the fine structure of pathologically altered pathways of bile conduction.

Cowie, A. T. & Tindal, J. S. (1961). **The maintenance of lactation in the rat after**

hypophysial anterior lobectomy during pregnancy. — J. Endocrin. 22, 403-408. [Abst. from authors' summary.] **3760**

Experiments to determine the pituitary hormones necessary for the maintenance of lactation in the rat in the absence of either the anterior lobe of the pituitary or the entire pituitary are described.

The experiments confirm that prolactin and ACTH are two important factors in the maintenance of milk secretion in the rat. Since only partial restoration was achieved, however, it is clear that other factors, presumably of anterior-pituitary origin, are required for the full restoration of lactation.

Schmid, D. O. & Buschmann, H. (1961). Zum Nachweis von Blutgruppenfaktoren und Serum-transferrinen im Foetalblut von Rindern. [Blood-group factors and serum transferrins in blood from bovine foetuses.] — Z. ImmunForsch. 121, 233-238. **3761**

The authors examined 650 foetuses. The youngest age at which blood group factors were demonstrable was in a foetus measuring 17 mm. (28-35 days of age). — R.M.

Robinson, G. A., Bier, A. M. & McCarter, A. (1961). Labelling of blood platelets of the pig with ^{35}S sulphate. — Brit. J. Haematol. 7, 271-275. **3762**

Measurement of the radio-activity of platelets following i/v inj. of labelled sulphate indicated that the biological half-life of labelled platelets was 39 hours. — R.M.

Dukes, P. P. & Goldwasser, E. (1961). Inhibition of erythropoiesis by estrogens. — Endocrinology 69, 21-29. [Authors' abst. modified.] **3763**

Both natural and synthetic oestrogens rapidly depressed erythropoiesis in male rats. The doses employed and the time relationships obtained in these experiments suggest that oestrogens are part of the regulatory mechanism governing red cell production.

Riegel, K., Hilpert, P. & Bartels, H. (1961). Vergleichende Untersuchungen der Erythrocytenmorphologie, des fetalen Hämoglobins und der Sauerstoffaffinität des Blutes von Säuglingen, Zicklein und Lämmern. [Comparison of erythrocyte morphology, foetal haemoglobin and oxygen affinity of the blood of babies, young goats and lambs.] — Acta haemat. 25, 164-183. [Summaries in English and French.] **3764**

The authors determined haemoglobin, foetal haemoglobin, number and diameter of

erythrocytes, haematocrit, erythrocyte volume and haemoglobin content, and oxygen dissociation in blood collected at intervals from 31 babies between 1 and 105 days of age, 6 male goats up to 5 months and 4 lambs up to 2 months of age. Comparison of the results is shown in 6 graphs and 4 tables. In the animals, changes towards adult values commenced at 7 weeks of age. — R.M.

Varnell, T. R. (1960). Factors influencing the electrophoretic pattern of serum proteins, glycoproteins, and lipoproteins in the sera of the bovine and ovine species. — Dissertation, Arizona pp. 123. [Abst. from Diss. Abstr. 21, 1615-1616.] **3765**

Paper electrophoresis was utilized to study the effect of various nutritional and physiological factors on blood serum protein, glycoprotein, and lipoprotein fractions in the serum of cattle and sheep.

Proteins, glycoproteins and lipoproteins were not affected by parturition in cows. Proteins and glycoproteins in serum samples from rat, dog, cow, and sheep were relatively stable at storage temperatures of -30° , 10° , and 37°C . A species difference was indicated in the effect of temperature on protein fractions. Lipoproteins were adversely affected within 2 days at 10° and 37°C . and within 2 weeks at -30°C .

Marggraff, I. (1961). Zur Frage der Gesamteiweißbestimmung im Blutserum verschiedener Tiere. [Determination of total protein in the serum of various animals.] — Mh. Tierheilk. 13, 96-98. **3766**

Total protein, albumin and globulin values in rat, rabbit, g.pig, sheep, pig, calf and cow serum were determined by the biuret method and colorimetrically, using the Zeiss colorimeter Elko III. There are tables giving average protein values in g./100 ml. of serum in the species stated. — E.G.

Preston, T. R. & Ndumbe, R. D. (1961). Diurnal variations in blood sugar concentration in ruminating calves. — Brit. J. Nutr. 15, 281-285. [Authors' summary modified.] **3767**

Diurnal variations in the concentration of reducing sugar in venous blood were studied in groups of five calves aged 12 weeks given either whole milk; concentrates; or dried grass; the calves had been weaned at 3 weeks and rumination was well established.

With a milk diet there was a sharp rise immediately after feeding followed by an equally rapid fall to prefeeding levels. With

dried grass there were no changes due to feeding. With concentrates there was a depression to a minimum value 3 hours after feeding and then a gradual rise to a maximum value 8-12 hours later. When no food was given there was a steady fall in blood-sugar values.

Stilinović, Z. (1961). Trostruki intravenozni test tolerancije glukose kod gravidnih krava. [Triple intravenous glucose-tolerance test in pregnant cows.]—Vet. Arhiv 31, 98-108. [In Croat. Summaries in English and German.]

3768

Three doses of 0.3 g./kg. body weight of a 20% soln. of glucose were injected i/v into four healthy pregnant cows, at intervals of 2 hours, and glucose blood and urine levels were determined. During this period an average of 2 l. of urine was voided, and it contained about 10% of the total glucose administered, in a conc. of 2%. There was no hypoglycaemic phase. In cattle disappearance of glucose from the blood was 18% faster than in man. There was a reduction in circulating eosinophiles by 58%, and lymphocytes by 39%. Neutrophiles increased by 90%.—E.G.

Trolldenier, H. (1960). Wachsplattenrekonstruktionen einschliesslich mikroskopischer Untersuchung der Leberzellplatten bei Rind, Schaf und Schwein. [Wax plate reconstruction and histological structure of liver parenchyma in cattle, sheep and pigs.]—Wiss. Z. Humboldt-Univ. 9, 831-850. [Summaries in English, French and Russian.]

3769

A detailed description of the technique of wax plate reconstruction of histological sections of ox, sheep and pig liver, with a review of the literature. Serial sections of liver were examined and modelled in wax. Since the thickness of the sections and that of the wax plates was known, other dimensions could be worked out proportionally, using the formula: magnification = thickness of wax plate divided by thickness of section.—E.G.

Miklaušić, B. & Rapić, S. (1961). Prilog pasaži tekućine jednjakom u domaćih životinja. [Passage of liquids in the oesophagus of domestic animals.]—Vet. Arhiv 31, 92-97. [In Croat. Summaries in English and Russian.]

3770

Secondary peristalsis in the oesophagus of horse, donkey, ox, sheep, goat, pig and dog was studied, following the introduction by tube of a liquid contrast medium. When the animal's head was raised, liquid flowed by

gravity and secondary peristalsis was not observed. Continuous flow occurred when liquid was introduced under pressure or in large amounts. Peristaltic gulps contained 70-130 ml. in horses, 40-70 in donkeys, 100-250 in cattle, 50-120 in sheep and goats, 50-120 in pigs and 60-100 in dogs. Liquid passed at a rate of 35-45 ml./sec. in horses and sheep, 25-35 in donkeys, 65-75 in cattle, 30-40 in goats, 20-30 in pigs and 10-15 in dogs.—E.G.

I. Baker, G., Jones, L. H. P. & Wardrop, I. D. (1961). Opal phytoliths and mineral particles in the rumen of the sheep.—Aust. J. agric. Res. 12, 462-472.

3771

II. Baker, G., Jones, L. H. P. & Milne, A. A. (1961). Opal uroliths from a ram.—Ibid. 473-482. [Authors' summaries modified.]

3772

I. Examinations of plant feeds and the contents of the rumen of sheep revealed opal phytoliths both free and *in situ* in the plant tissues. Opal phytoliths make up the greater proportion of the particulate mineral matter in both the feeds and the rumen contents but adventitious particles of minerals and inorganic or metallic fragments were detected. All these particles have a higher specific gravity than plant feed and so gravitate to the ventral regions of the rumen. Observations on the rumen walls of sheep suggest that opal phytoliths and other mineral particles may affect the depth of the strata corneum and granulosum.

II. The examination of uroliths from a ram under the petrological microscope, and by chemical and physical techniques, revealed that they consisted largely of opaline silica. Most of the opal was authigenic, being derived from the soluble silica ingested in the plant feed. Mechanisms for the precipitation of authigenic opal are discussed. Some of the opal was in the form of particles which were identified as phytoliths, silicisponge spicules, and frustules of diatoms. The presence of these allochthonous particles in uroliths raises complex pathological issues which are discussed briefly.

Brownlee, A. & Elliot, J. (1961). The influence of diet on the presence of an iron-containing pigment in the keratinised layer of the epithelium of the rumen, reticulum and omasum of cattle.—Vet. Rec. 73, 384.

3773

There is evidence that the dark keratinized layer found in the epithelium of the rumen, reticulum and omasum of some cattle and sheep, contains iron. When the

epithelium of these compartments from cattle of all ages was tested for iron it was present in 120 out of 297. No iron was found in the 64 abomasums examined.

Twelve calves were reared to 2 months on milk and hay and 12 on an early weaned diet. At P.M. examination the epithelium from the rumen, reticulum and omasum of the calves in the second group was darker than the others and contained iron.—E. J. CASTLE.

Ash, R. W. (1961). **Stimuli influencing the secretion of acid by the abomasum of sheep.** —*J. Physiol.* 157, 185-207. [Author's summary modified.] 3774

Methods are described for the study of intra-abomasal factors on acid secretion by innervated abomasal pouches.

Distension of the abomasum with a saline-filled balloon stimulated acid secretion; secretion was inhibited when the acidity of the free fluid in the abomasum increased to about pH 2.

The mechanisms mediating the secretion stimulated by distension showed little or no adaptation.

The introduction of rumen fluid and buffered solutions at pH 5-7 directly into the abomasum stimulated acid secretion. Secretion was usually well maintained until the acidity of the fluid in the abomasum increased to pH 1.9-2.8. Large volumes of fluid produced greater responses than small ones.

The presence of fatty acid and increased concentrations of these metabolites in the solution potentiated the responses. Fatty acid was absorbed from the solutions introduced into the abomasum.

Phosphate-HCl solutions (pH 2.1-2.4) containing 50 mM fatty acid failed to stimulate acid secretion appreciably when introduced into the abomasum. Abomasal fluid (pH 2.5) from fasting and normally fed sheep evoked a small but definite response. Acid secretion was inhibited by psychic stimuli, the introduction of HCl into the duodenum and by intravenous injections of adrenaline and atropine. The possible role of stimuli acting in the abomasum on acid secretion during normal digestion in the sheep is discussed.

van Weerden, E. J. (1961). **The osmotic pressure and the concentration of some solutes of the intestinal contents and the faeces of the cow, in relation to the absorption of the**

minerals. —*J. agric. Sci.* 56, 317-324.
[Author's summary modified.] 3775

In the cow's intestine there is no isotony with the blood serum. In the upper part of the small intestine the chyme is strongly hypertonic but as it passes to the large intestine it becomes more and more hypotonic. The hypertony in the small intestine is not due to inorganic elements but is caused by organic non-electrolytes.

In the large intestine hypotony is the result of strong selective absorption of sodium against a concentration gradient. This is an important aspect of the sodium metabolism of the cow. Chlorine is also absorbed from the large intestine against a concentration gradient.

Pellegrini, S. & Pellegrini, N. (1960). Il comportamento delle cellule "A" e "B" delle isole pancreatiche durante la gravidanza in Bos taurus L. (Nota preventiva). [The A and B cells of the islets of Langerhans in pregnant cows.] —*Atti Soc. ital. Sci. vet.* 14, 349-353. [Summaries in English and French.] 3776

In the early stages of pregnancy in cows there was a high percentage of A cells in the islets of Langerhans. From the seventh month onwards the B cells predominated. These phenomena are correlated with metabolic requirements during pregnancy.

—T.E.G.R.

Dussardier, M. (1961). Effets de la vagotomie intrathoracique partielle sur la survie et la croissance du mouton. [Effects of partial intrathoracic vagotomy on survival and growth, in sheep.] —*Ann. Biol. anim.* 1, 141-144. [Summary in English.] 3777

Intrathoracic section of the left vagus nerve or of the abdominal vagal trunk was tolerated perfectly by 10 lambs. But intrathoracic section of the cervical vagal trunk in another 5 caused vomiting and bloating. Three died from aspiration pneumonia.

—M.G.G.

Lauber, J. K., Shutze, J. V. & McGinnis, J. (1961). Effects of exposure to continuous light on the eye of the growing chick.—*Proc. Soc. exp. Biol., N.Y.* 106, 871-872. [Author's summary modified.] 3778

Continuous exposure of the eyes of chicks to incandescent light led to profound enlargement of the eyeball, associated with accumulation of fluid in the vitreous body. Histological changes were evident in several

layers of the eye, the most striking being a thinning of the retina. Exposure to continuous light reduced the thickness of the nerve fibre layer and the layer of rods and cones.

Orgebin, M.-C. (1961). *Étude du transit epididymaire des spermatozoïdes de taureau marqués à l'aide du ³²P.* [Radiophosphorus studies on the passage of spermatozoa through the epididymis in bulls.]—Ann. Biol. anim. 1, 117-120. [Summary in English.] 3779

The isotope was injected i/v into 22 bulls, of which 10 were castrated 36-43 days later. Radioactive spermatozoa first appeared in the epididymis 41 days after injection, and in ejaculates 49-52 days after injection. It was concluded that spermatozoa take 8-11 days to pass through the epididymis in bulls.—M.G.G.

Amoroso, E. C. (1961). *Histology of the placenta.*—Brit. med. Bull. 17, 81-90. 3780

It is stated that the abundant available literature on placental structure dealt mainly with topography and histology as revealed by conventional histological and histochemical methods. Electron microscopic findings in part confirmed and in part differed from those made with the light microscope, but further tests are required to confirm any fresh conclusions drawn. The short chapters of the paper are headed evolution of placentation in mammals, the chorio-vitelline placenta, the placental barrier and Grosser's classification, the epitheliochorial membrane, the syndesmochorial membrane, the endotheliochorial membrane of carnivores, the haemochorial membrane of rodents and the haemochorial membrane of anthropoids. There are five

See also absts. 3830 (book, avian physiology); 3831 (book, animal vision).

PUBLIC HEALTH, VETERINARY SERVICES AND VETERINARY EDUCATION

Rammell, C. G. (1961). *The estimation of blood in bovine milk.*—J. Dairy Res. 28, 131-138. [Author's summary.] 3784

Details are given of a method, based on the peroxidase activity of the sedimented erythrocytes, that is suitable for the quantitative estimation of blood in milk.

Keogh, B. P. (1961). *A simple test for the detection of penicillin.*—Aust. J. Dairy Tech. 16, 19-21. 3785

K. modified the qualitative test described by Thurell & Bylund (1960) in *Svenska Mejeritidn.* 14, 171. It is based on the ability of a thermophilic streptococcus to ferment

plates containing 16 electron micrographs and 11 photomicrographs and there is a list of 79 references.—E.G.

Thuillie, M.-J., Lacassagne, L. & Calet, C. (1961). *Étude de l'influence de la D-L thyroxine sur le poids de l'oeuf, sur le poids du jaune et sa composition.* [Effect of thyroxine on egg weight and on weight and composition of the yolk.]—Ann. Biol. anim. 1, 134-140. [Summary in English.] 3781

Six hens were fed increasing amounts of D-L thyroxine (from 1 to 3.5 mg. daily) for 8 weeks. Egg weight, egg yield and yolk weight decreased, but no effect was noted on yolk composition.—M.G.G.

Moriconi, A. & Lorvik, S. (1960). *Sul modo di originarsi delle arterie bronchiali nel Bos taurus.* [Origin of the bronchial arteries in the ox.]—Atti Soc. ital. Sci. vet. 14, 504-508. [Summaries in English and French.] 3782

It is concluded that the bronchial arteries may arise as: two distinct trunks, bronchial and oesophageal (with variations in site and course); a common broncho-oesophageal trunk, which is rare. The course of the arteries is described.—T.E.G.R.

Wheatley, V. R. & Sher, D. W. (1961). *Studies of the lipids of dog skin. I. The chemical composition of dog skin lipids.*—J. invest. Derm. 36, 169-170. 3783

The fatty acids of the hair lipids were largely single-branched acids. The lipids of the hair contained unusually large amounts of cholesterol. Pro-vitamin D was not found in the skin; the authors suggested that dogs rely on dietary sources of this vitamin.—R.M.

lactose to yield acid, detected with the aid of bromcresol purple. Penicillin inhibits the production of acid. Results were obtained after 1.5-2 hours of incubation.—R.M.

Atkinson, J. W. (1961). *Suggestions for dealing effectively with poultry hygiene problems.*—Amer. J. publ. Hlth 51, 723-731. 3786

Poultry hygiene could be improved by close co-ordination of public health requirements, consumers' requirements, and the poultry industry. Among the items discussed were inspection at the processing plants before and after slaughter; inspection of the processing plants and products such as pies,

patties, soups etc., their ingredients, additions and preservatives; condemnation of unfit birds, carcasses and products; co-operation with livestock disease control authorities; protection of edible products from dust and dirt during and after processing; cleanliness of equipment, including refrigeration, cooking and canning.—E.G.

See also *absts.* 3471 (tuberculous milk from attested herds); 3496 (salmonella in the liver of slaughtered pigs); 3497 (salmonellosis in a girl from a tortoise); 3499 (imported kangaroo meat, a source of salmonellosis); 3500 (salmonellosis in England and Wales); 3501 (salmonella in fish meal); 3502 (salmonellosis in imported chicks); 3504 (latent avian salmonellosis associated with human disease); 3518 (brucellosis in a veterinary surgeon); 3611 (virus B infection of monkeys communicable to man); 3620 (psittacine birds as source of human virus infections in England); 3629-3630 (Q fever); 3648-3649 (E. granulosus and *T. hydatigena* in food animals in New Zealand); 3716 (health service for bulls in Mecklenburg).

REPRODUCTION AND REPRODUCTIVE DISORDERS

Bennett, J. P. (1961). A needle probe Geiger-Müller counter for the study of the passage of the ovum in the reproductive tract.—Nature, Lond. 190, 788-789. 3788

A description of a needle probe which is inserted into the reproductive tract of a cow to detect radioactivity emitted by artificial ova—resin spheres impregnated with gold-198.

—M.G.G.

Harper, M. J. K., Bennett, J. P. & Rowson, L. E. A. (1961). A possible explanation for the failure of non-surgical ovum transfers in the cow.—Nature, Lond. 190, 789-790. 3789

Radioactive resin spheres simulating ova were introduced through the cervix of heifers about 3 days after oestrus, and the reproductive tract was tested for radioactivity between $\frac{1}{2}$ hour and 20½ hours later. Cow ova were introduced into the uterus of another group of heifers which were slaughtered 1½-3 hours later. The findings showed that a cause of failure of non-surgical ovum transfer in the cow is the ejection of ova about 1½ hours after insertion. This may be due to stimulation of the cervix, causing the release of oxytocin from the pituitary gland, and consequently uterine contractions.—M.G.G.

Anon. (1961). A guide to pregnancy diagnosis and the investigation of infertility in cattle. pp. 27. London: The British Veterinary Association. 3790

The first third of this booklet consists of a general review of the economic aspects and one on the relevant female physiology, with a purely theoretical digression on the therapeutic use of progesterone. Reasons for the inapplicability of non-rectal pregnancy diagnosis methods follow, with a brief practical review of the technique of the rectal method, which

Davis, R. A. (1961). Control of rats and mice.—Bull. Minist. Agric. Lond. No. 181 pp. 29. London: H.M. Stat. Off. 4s. 3787

This booklet describes the control of rats and mice by poisoning, gassing, fumigating, and trapping, the prevention of infestation by hygienic measures and the proofing of buildings, and the diseases carried by rats and mice.—M.G.G.

is not considered applicable before 5-6 weeks. A table of crown-rump foetal lengths is appended. [Data on the variability in rate of a developing pregnancy receive little mention.] After definitions of what may constitute a herd breeding problem, instructions are given for the "pre-visit" analysis of breeding records, but the importance of the incidence of 25-36 day between-service intervals, and of management for yield, including feeding, is not discussed.

A very detailed account is given of bull examinations, but without reference to the use of preputial lavage as a diagnostic aid. There are directions for examining the cow and heifer. [No description is given of the technique for examining the ovarian bursae and there is no mention of the usefulness of vulsellum forceps.] Hormone treatments for the bull are described [but treatment of infections is not included]. Treatment recommendations for the female follow. The concluding recommendation not to change any ration being fed unless a herd problem has actually developed does not seem justified.

—F. L. M. DAWSON.

Makay, L. (1961). Csökkent életképességi borjak roborálása. [Steroid treatment of unthrifly calves.]—Mag. állator. Lapja 130-131. [Summaries in English and Russian.] 3791

The aetiology and treatment of unthrifliness in calves (inadequate growth and weight gain, and poor appetite and coat) are discussed. It is suggested that the decreased vitality of calves is basically due to a halt in the restitution of the endocrine balance to normal following any infectious or deficiency disease. The author believes that for the revitalization of such animals hormone treat-

ment is rational, although it must be supported by improved husbandry and feeding, administration of vitamins (particularly vitamin B) and the treatment of the initial condition with sulphonamides, antibiotics and parenteral administration of bovine blood.

The author used two oestrogen preparations for the treatment of devitalized calves, with satisfactory results: "Syntestrin" (diethylstilboestrol dipropionate) and "Durabolin" (a Dutch preparation, norandrostenedione phenylpropionate). Of each preparation 4-8 consecutive doses of 10-30 mg. were given at 1-2 week intervals. On one occasion the author made a small scale trial on 5 Hungarian Red and White calves aged 2 months.

The author noted that Syntestrin had more effect on the weight gain, while Durabolin was beneficial rather to the development of the devitalized calves, which later he therefore considered superior. He did not observe any adverse effect on the breeding function of the animals treated in this way, in their later life.—A. SEBESTENY.

Zimbelman, R. G., McShan, W. H., Tyler, W. J. & Casida, L. E. (1961). **Effect of a pituitary extract on the bovine corpus luteum of late pregnancy.**—*J. Anim. Sci.* 20, 246-248. [Authors' summary modified.] 3792

A single i/v injection of unfractionated gonadotrophic extract from sheep pituitary glands was given to six cows about 72 hours before slaughter. Six uninjected cows were controls; both groups were slaughtered at 233-247 days of pregnancy. There were no apparent effects of this injection on the foetus or on the status of the pregnancy. No obvious effects were visible from a gross study of the ovary or in the histological picture of the corpus luteum. The mean corpus luteum weight was 1 g. lower (6.18 against 7.20 g.) in the treated group. A significant decrease from 18.8 µg. per g. fresh tissue to 4.8 µg. per g. occurred in total progestogen concentration, and total progestogen content per gland decreased from 136 µg. in the controls to 32 µg. in the group injected with gonadotrophin. Cholesterol levels were the same in the two groups.

Nobel, T. A., Folman, Y. & Volcani, R. (1961). **[A histopathological study of the genital organs of diethylstilboestrol (DES)-implanted bull-calves.]**—*Refuah vet.* 18, 1-2. [In

Hebrew. In English p. 57. English summary modified.] 3793

In implanted intact bull calves the most striking histological changes were:—testicular degeneration or hypoplasia, proliferation of interstitial cells, hyperplasia of epididymal epithelium and nodular proliferation of basal reparation cells as well as squamous metaplasia of ampullae, seminal vesicles, prostate and bulbo-urethral glands. Histological findings suggest that, to maintain aspermia, implantation should begin at an early age and be repeated in moderate doses at fixed intervals, the last treatment to be applied 2-3 months before slaughter.

Wodzicka-Tomaszewska, M., Braden, A. W. H. & Turnbull, K. E. (1961). **Effect of oestrogen and progesterone on the dilatability of the ovine vagina.**—*Aust. J. agric. Res.* 12, 327-334. [Authors' summary.] 3794

Twenty ovariectomized ewes were given a single injection of stilboestrol or stilboestrol dipropionate. In ewes given stilboestrol, the rate of increase in apparent vaginal volume and the time required for return of basal levels were similar to those in entire ewes at the time of oestrus. The esterified hormone was slower and more prolonged in action. Pretreatment with progesterone did not affect the vaginal changes, though it enhanced and hastened the onset of behavioural oestrus. The results are presumptive evidence that the greater dilatability of the ovine vagina at oestrus is an oestrogenic response.

Reardon, T. F. & Robinson, T. J. (1961). **Seasonal variation in the reactivity to oestrogen of the ovariectomized ewe.**—*Aust. J. agric. Res.* 12, 320-326. [Authors' summary modified.] 3795

Fifteen tests at an average interval of 4 weeks for 14 months showed an annual rhythm in the proportion of spayed crossbred ewes which exhibited oestrus after an injection of 15.6 µg. oestradiol benzoate following a 12 day period of progesterone treatment. Reactivity was highest in late summer and early autumn and lowest in winter and early spring, periods of low environmental temperatures and low body weights.

The significance of the rhythm is discussed with particular relation to the phenomenon of "silent oestrus".

No similar rhythm was detected in the vaginal response to oestrogen.

Becze, J. (1961). Progeszteron-kísérletek a szekréciós fázis zavarai és a magzattfelszívódás miatti meddőség megelőzésére. [Progesterone in the treatment of sterility in sows and cows.] —Mag. állator. Lapja 16, 84-85. [In Hungarian. Summaries in English and Russian.] 3796

The value of progesterone in the treatment of repeat breeder cows and in the increase of the litter size of sows was studied. The trials were based on the assumption that progesterone would prevent the early death and reabsorption of the embryo through its influence on the secretory phase of the oestrous cycle.

Trials on 35 inseminated Berkshire sows proved to be disappointing. The conception rate, litter size and weight of the group of 19 control sows were superior to those of a group of 16 sows, each of which received daily i/m doses of 50 mg. progesterone for 5 consecutive days.

On the other hand progesterone proved to be of value in the treatment of repeat breeder cows. To cows from three groups showing various irregularities in their breeding cycle, daily i/m doses of 100 mg. progesterone were administered for 5 consecutive days. From the first group of 11 treated repeat breeder cows, whose infertility could not be associated with any detectable pathological symptoms, 5 conceived, while of 11 such untreated cows 3 conceived. Of a group of 28, most of which showed abnormal secretion during oestrus, such as opacity, pus flakes or streaks, or abnormally low viscosity, 14 animals were treated, and 7 of these conceived in contrast with 4 of the remaining untreated 14 animals. Of a group of 10 cows which had cystic ovaries 4 conceived after treatment. It was noted in the second trial, that none of those animals, which showed opacity or pus in their oestral secretion, conceived even after progesterone treatment. It was therefore concluded that progesterone is valuable in the treatment of infertility of cows, when the oestral secretion is normal, or of low viscosity, but is not likely to be so when the secretion is purulent.—A. SEBESTENY.

Lettow, E. (1961). Leberfunktionsproben bei Hündinnen mit hormonell bedingten Gebär-muttererkrankungen. [Liver function tests in bitches with uterine diseases of hormonal origin.] —Zbl. VetMed. 8, 353-359. [Summaries in English, French and Spanish.] 3797

Liver biopsy in 63 bitches with uterine

diseases, resulting from abnormal hormonal function, revealed mild to severe degenerative or inflammatory liver lesions. The value of these findings was discussed in relation to results of the bromphthalein test, and tests for serum alkaline phosphatase, glutamic acid oxaloacetate transaminase, glutamic acid pyruvic transaminase and lactic acid dehydrogenase activity.—E.G.

Schofield, B. M. (1961). The acute effect of progestational compounds on intact rabbit myometrium. —J. Physiol. 157, 117-123. [Author's summary modified.] 3798

The acute effect of progesterone on myometrial tension was re-investigated in the intact rabbit using an improved technique. Some related compounds were also tested.

A depressant action was not demonstrable when the compounds were given by intra-uterine injection.

The effectiveness of intra-uterine injection was indicated by the stimulant action of oxytocin injected in this way.

Experiments with progesterone $4-^{14}\text{C}$ isotope showed that progesterone was, in fact, reaching the myometrium of the intact uterus but in much lower concentrations than when isolated strips are suspended in Krebs' solution.

Pellegrini, S. & Trimarchi, G. (1960). Modificazioni strutturali delle ovaie e della cute di rate (Mus Rattus albinus) dopo trattamento percutaneo prolungato con benzoato di alfa-estradiolo. [Structural changes of the ovaries and skin of rats after prolonged treatment with oestradiol benzoate.] —Ann. Fac. Med. vet. Pisa 13, 174-189. [Summaries in English and French.] 3799

Female rats in two groups of 10 were treated with oestradiol benzoate for 20 days by rubbing into the skin 1 g. ointment containing 0.1 mg. hormone, or by i/m inj. every five days, of 0.5 mg. hormone in oily suspension. A control group was treated with ointment base, rubbed into the skin. Changes observed were: arrested development of and, in some, retrogressive changes in the ovarian follicles as well as proliferation of the corpora lutea with an increase of their cell volume; in the skin there was thickening of the various layers, particularly the spinous and granular, due to an increase in volume and number of cells. It is considered that (with appropriate dosage) the percutaneous route is preferable when prolonged treatment is necessary, even in large animals.—T.E.G.R.

Oliva, O. (1960). Indagini sull'attività jaluronidase del liquido seminale di tori con necrospermia. [Hyaluronidase activity of the seminal fluid of bulls with necrospermia.] — Atti Soc. ital. Sci. vet. 14, 262-269. [Summaries in English and French.] 3800

There was no difference between the hyaluronidase content of live and of dead spermatozoa but it is concluded that live spermatozoa can produce the enzyme *in vitro*.

—T.E.G.R.

Anderson, J. L. (1961). Breeding problems in cattle in Papua and New Guinea.—Aust. vet. J. 37, 162. 3801

A small Brahman herd was imported into Papua and New Guinea for cross breeding experiments in the beef cattle improvement programme.

The failure of the Brahman cows to return to oestrus soon after calving is hampering production from the herd.

One of the cows aborted a five month female foetus, but carried to full term the male twin. No reason is known for the abortion.—A. CULEY.

Cox, D. F. (1960). The relation between sex and survival in swine.—J. Hered. 51, 284-286. 3802

From data collected from over 4,500 purebred and crossbred pigs of both sexes in Iowa it was established that the survival rate from birth to slaughter age was 71% in purebred males, 76% in purebred females, 76% in crossbred males and 77% in crossbred females.—E.G.

Geiringer, E. (1961). Effect of ACTH on sex ratio of the albino rat.—Proc. Soc. exp. Biol., N.Y. 106, 752-754. [Author's summary modified.] 3803

Subcutaneous administration every second day of one unit of long-acting corticotrophin to female albino rats before and during mating significantly depressed the sex ratio of their first litters.

Gahne, B. (1961). Studies of transferrins in serum and milk of Swedish cattle. — Anim. Prod. 3, 135-145. [Author's summary modified.] 3804

Transferrins were studied using the starch gel method. With sera from young calves each transferrin allele appeared to determine four fractions. Among some animals from Norway two seemed to have a transferrin type not previously described for European cattle breeds. The transferrin types

were used in parentage testing and a formula is given for the possibility of making exclusions. The value of the transferrin types in diagnosis of zygosity in cattle twins is shown. The transferrins seem to occur also in bovine milk.

Lee, D. H. K. (1961). Problems in the environmental adaptation of domestic animals. — Ann. N.Y. Acad. Sci. 91, 608-616. 3805

Lorincz, A. E. (1961). Heritable disorders of acid mucopolysaccharide metabolism in humans and in snorter dwarf cattle.—Ibid. 644-658. 3806

These reviews are among the 17 papers published under the title "Genetic perspectives in disease resistance and susceptibility" as Article 3 of volume 91 of Annals of the New York Academy of Sciences. Contributors to the discussions included F. B. Hutt on his work with fowls and J. H. Whitlock on helminths in sheep.—R.M.

Foley, C. W., Heidenreich, C. J. & Lasley, J. F. (1960). Influence of the dwarf gene on insulin sensitivity of beef cattle. — J. Hered. 51, 278-283. 3807

Sensitivity to insulin was compared in bovine dwarfs, in carriers of the dwarf gene and in homozygous normal beef cattle. Dwarfs were more sensitive to insulin than known carriers and normal beasts.—E.G.

Lagerlöf, N. & Settergren, I. (1961). Gonadenhypoplasie beim Rind der schwedischen Gebirgsrasse. [Gonadal hypoplasia in Swedish Mountain cattle.] — Zuchthyg. FortpflStörung. u. Besamung 5, 141-158. [Summaries in English and Russian.] 3808

About 25 years ago, testicular and ovarian hypoplasia was widespread in Swedish White Polled Mountain cattle and about 30% were affected, at least unilaterally. Incidence of the condition, which is due to a recessive autosomal gene, has been greatly reduced by selective breeding.—E.G.

Belling, T. H., Jr. (1961). Ventricular septal defect in the bovine heart—report of 3 cases. — J. Amer. vet. med. Ass. 138, 595-598. [Author's summary modified.] 3809

Within a 2½-year period, 3 calves in a small purebred Hereford herd had interventricular septal defects. The defects are described and the possibility that they were due to inheritance is discussed.

Bonner, R. B., Mylrea, P. J. & Doyle, B. J. (1961). **Arthrogryposis and hydranencephaly in calves.**—Aust. vet. J. 37, 160. 3810
An outbreak is recorded on the south

See also absts. 3480 (congenital and uterine *M. johnnei* infection in sheep); 3481 (*Corynebact. pyogenes* in bull semen); 3491 (*Ps. pyocyanea* from the genital system of bulls); 3505-3524 (brucellosis); 3530-3531 (vibriosis); 3557 (trichomoniasis); 3587 (equine virus abortion); 3591 (infectious bovine rhinotracheitis-infectious pustular vulvovaginitis); 3712 (genetics and diseases of laboratory animals).

ZOOTECHNY

Atmadilaga, D. (1959). **Cattle breeding in Indonesia with special reference to heat tolerance.**—Thesis, Bogor pp. 121. [In English. Summaries in German and Indonesian.] 3811

Rhoad's test and Benzra's test for heat tolerance were carried out on 225 cattle of Indonesian, European, and crossed breeds in different parts of Indonesia. Indigenous cattle tolerated heat better than those of European descent. Bali cattle were the most tolerant, and Madura cattle tolerated heat well if they were in good condition. Individual differences in the heat tolerance of European dairy cattle suggested that it should be possible to select for this capacity.—M.G.G.

Rose, A. L. (1961). **Methods of movement of cattle in Northern Australia, with special reference to the Northern Territory.**—Aust. vet. J. 37, 149-156. 3812

More cattle are moved on the hoof in Northern Australia than by all other methods. This method, and road and rail transport of cattle, are described from the points of view of efficiency and economics. Transport by sea to Manila, Hong Kong, and Queensland, and two movements by air within Australia, are mentioned.

TECHNIQUE AND APPARATUS

Roller, W. L. (1961). **Filtration of poultry house air.**—Res. Bull. Ohio agric. Exp. Sta. No. 879 pp. 20. 3814

An automatic paper filter was an effective and the most practical means of filtering poultry house air. A copper mesh filter was difficult to clean. Using deep litter itself as a filter by means of a down-draught through the litter situated on a false floor of wire mesh or broken stones was the most effective means of filtering air, but the litter had to be stirred every few days.—M.G.G.

Salzman, N. P. (1961). **Animal cell cultures.**—Science 133, 1559-1565. 3815

An account of the nutritional requirements and maintenance of animal cell cultures,

coast of New South Wales involving 16 cases on nine farms of suspected hydranencephaly and/or arthrogryposis. [See *V.B.* 27, 2181 and 28, 300.]—A. CULEY.

Only two diseases, having particular application to movement, have been noted. Pulmonary pasteurellosis occurred in cattle which had been badly driven and then subjected to a long railway journey. The gastro-intestinal type of pasteurellosis is not uncommon in cattle going overseas. Transit tetany occurs sometimes in cattle after long road or rail journeys.—A. CULEY.

Anon. (1961). **Recommendations for the carriage of live animals by air. Part 3. Rodents, rabbits and small fur-bearing animals. Part 4. Dogs and cats. Part 5. Day-old chicks and turkey poult. Part 6. Reptiles.** pp. 16+15+8+8. London: British Standards Institution. [British Standard No. 3139.] 3813
5s. for each part.

Parts 1 and 2 of these recommendations dealt with monkeys for laboratory use and seed-eating birds. The new parts deal with chinchillas, guinea-pigs, hamsters, mice, rats, rabbits, nutria, dogs, cats, chicks, poult, and reptiles (including tortoises and terrapins). The object of these publications is to lay down standards for cage construction, number of animals to a cage, labelling, and care of the animals before, during and after flight.—R.M.

their use in the detection of viruses and cytotoxic agents, the production of clones, and genetic studies with human cell cultures.

—M.G.G.

Soliman, M. K. (1961). **Fluoreszenzmikroskopische Zählung von eosinophilen Leukozyten bei Tierarten, die Pseudoeosinophile besitzen. [Counting eosinophile leucocytes by fluorescence microscopy, and differentiation from pseudoeosinophiles.]** — Zbl. VetMed. 8, 323-326. [Summaries in English, French and Spanish.] 3816

In blood smears from rabbits and g.pigs, stained with 1:1,000 aqueous soln. of aniline blue and examined by the fluorescence microscope, eosinophile leucocytes fluoresced more

brilliantly than pseudo-eosinophiles. In blood from geese, ducks and pigeons, differentiation was impossible because both, eosinophiles and pseudo-eosinophiles fluoresced equally. In turkey, guinea-fowl and fowl blood the large number of corpuscles involved made differentiation and enumeration difficult.

—E.G.

Irwin, D. H. G. (1960). **Chemical depilation in surgical practice.** — J. S. Afr. vet. med. Ass. 31, 391-395. [Author's summary.] 3817

A depilatory cream containing calcium thioglycollate was found to be useful in dogs, cats, horses and sheep, but contra-indicated in cattle.

See also absts. 3458 (phage typing of mastitis staphylococci); 3470 (diagnosis of TB. in the horse); 3477 (typing of tubercle bacilli); 3478 (evaluation of virulence of tubercle bacilli); 3484 (Thorn's test in swine erysipelas); 3485 (testing of swine erysipelas vaccine); 3506 (sampling procedure for brucellosis testing); 3510 (Dutch c.f. technique); 3511 (microcolony brucella test); 3529 (assay study of *T. gondii* in cell culture); 3713 (laboratory handbook of vet. diagnostic procedures).

REPORTS

Great Britain. (1961). **Report of the Agricultural Research Council for the year 1959-60.** pp. 209. London: H.M. Stat. Off. 9s. 3820

At the Compton Field Station current research work includes BRUCELLOSIS, MASTITIS, JOHNE'S DISEASE, SCRAPIE, and PNEUMONIA IN PIGS. JOHNE'S DISEASE seems to be initially a disease of the lymphatic system, generalization and intestinal lesions occurring at a later stage. The c.f. test was shown to be influenced greatly by non-specific factors, and its results had to be interpreted along with other evidence. In experimental SCRAPIE in goats, lesions were found only in the c.n.s. The characteristic change was widespread non-specific neuronal degeneration accompanied by astrocytosis.

The World Reference Laboratory for F. & M. DISEASE at Pirbright has received over 1,300 samples from 30 countries since July 1958. Two strains of mice with high susceptibility to the virus and other desirable characters have been developed.

At the Animal Diseases Research Association at Moredun current research work includes JOHNE'S DISEASE, SHEEP PNEUMONIA, TICK-BORNE FEVER, SCRAPIE, HYPO-MAGNESEAEMIA, and WORMS IN SHEEP. Over 60% of Syrian hamsters are susceptible to oral infection with *Mycobacterium bovis*. The agent of TICK-BORNE FEVER has attained its 40th serial passage in g.pigs, and its 20th serial passage in mice.—M.G.G.

Bordet, R., Coulon, J. & Bernardin, M. (1961). Biopsies hépatiques par hépatectomie partielle chez le porc et le mouton. [Collection of liver samples by partial hepatectomy in pig and sheep.] — Rec. Méd. vét. 137, 253-258. [Summaries in English and Spanish.] 3818

The surgical technique is described for obtaining liver samples of 12-20 g. from pigs and sheep.—M.G.G.

Cowie, A. T. & Tindal, J. S. (1961). **Hypophysectomy of the goat.** — J. Endocrin. 22, 313-320. [Authors' summary.] 3819

A technique for the surgical removal of the pituitary of the goat using the parapharyngeal approach is described and the after-care of the animals is discussed.

Great Britain. (1961). **The Animal Health Trust. Tenth report 1957-1960.** pp. 100. London: The Animal Health Trust. 3821

This report gives an account of research into diseases of animals and birds sponsored by the Animal Health Trust in the period 1957-60.—M.G.G.

Republic of Ireland. (1961). **Twenty-ninth Annual Report of the Minister for Agriculture, 1959-60.** pp. 138 + 123 pp. Appendices. Dublin: Stationery Office. 8s. 6d. [Report of the Veterinary Research Laboratory pp. 64-71.] 3822

TUBERCULOSIS : 2.3% of 694 milk samples were positive. **BRUCELLOSIS** : of 1,914 blood samples 305 were positive and 104 doubtful. *Br. abortus* was isolated from 11 of 93 aborted calf foetuses, streptococci and staphylococci from 25, *Escherichia coli* from 8, and *Pseudomonas pyocyanea* from 2. Of 108 uterine swabs from mares, 13 yielded haemolytic streptococci, 5 haemolytic staphylococci, 8 *E. coli*, 2 Friedländer's bacillus, 3 yeasts, and 5 mixed contaminants. **AUJESZKY'S DISEASE** was diagnosed in pigs for the first time at the Laboratory. The main cause of death in pigs sent for examination was gastro-enteritis.

—M.G.G.

Netherlands. (1961). Mededelingen betreffende de Gezondheidsdienst voor Vee in Friesland. 41e Jaarverslag. [Annual report of the Health Service for Livestock in Friesland for

1959-1960.] Leeuwarden: Gezondheidsdienst voor Vee pp. 97. [In Dutch.] 3823

The source of TUBERCULOSIS for 18 cows in a tuberculosis-free herd was a member of the farmer's family who had severe pulmonary TB. caused by bovine-type bacilli. Measures for the control of BOVINE BRUCELLOSIS were described; compensation was paid for 8,178 reactor cattle that were slaughtered. The proportion of brucella-free herds increased from 78.6 to 94.6%.

The number of complement-fixation tests for JOHNE'S DISEASE was 7,737. In 340 cases the post-mortem findings were compared with c.f. titre (page 13).

In the health service for PIGS 340 herds participated, and all were visited at least twice during the year. Management was judged good in 57%, fair in 33% and bad in 10%. Virus pneumonia was recorded on 37 breeding farms (11%) and 26 of 49 fattening farms. Lice were present on 12% of farms and mange on 23%. A trial of ARTIFICIAL INSEMINATION for pigs started in November 1959 and in one year 468 pigs were inseminated with semen from eight boars. The final conception rate was 77.3%.—R.M.

U.S.A. (1961). Report of the New York State Veterinary College at Cornell University for

the year 1959-1960. [Poppensiek, G. C.] pp. 131. Ithaca, New York: The College. 3824

The greater part of this report consists of abstracts of research projects. Streptothricosis in the horse was identified for the first time in the U.S.A., and mycotic abortions in cattle are increasing. Lists of recent publications, the statistical reports of the clinics, the diagnostic laboratory and the regional poultry disease laboratories and the report of autopsies are given.—M.G.G.

U.S.A. (1961). University of Florida. Annual report of the Agricultural Experiment Stations for the fiscal year ending June 30, 1960. pp. 364. Gainsville, Florida: The University. [Veterinary Science pp. 175-180.] 3825

Four suspected outbreaks of virus pneumonia in pigs were investigated. Pneumonia was secondary to chronic swine fever in 3 cases, and to ascarid infestation in the fourth. Antigenic similarity between bovine viral diarrhoea virus and several bovine mucosal disease viruses was demonstrated. Changes in the blood and bone marrow of chickens with the haemorrhagic syndrome were characteristic of aplastic anaemia in the early stages and later of haemolytic anaemia.

—M.G.G.

BOOK REVIEWS

Gunsalus, I. C. & Stanier, R. Y. [Edited by.] (1961). The bacteria: a treatise on structure and function. Volume II. Metabolism. pp. xv + 572. New York (& London): Academic Press. \$15.00. 3826

This is the second of 5 volumes to be produced on "The Bacteria", the first volume being on structure of bacteria. It contains chapters on Energy-yielding metabolism in bacteria, fermentation of carbohydrates and related compounds, nitrogenous organic compounds, cyclic mechanisms of terminal oxidation, dissimilation of high molecular weight substances, survey of microbial electron transport mechanisms, cytochrome systems in aerobic and anaerobic-electron transport, bacterial photosynthesis and luminescence.

The book is extremely well produced and brings together in a single volume a great deal of information on microbial metabolism.

W. J. BRINLEY MORGAN.

Runnels, R. A., Monlux, W. S. & Monlux, A. W. (1960). Principles of veterinary pathology. pp. xii + 732. Ames, Iowa: The Iowa State University Press. \$12.50. 3827

In the preparation of this book, which is the successor to Runnels's "Animal Pathology", the senior author has been joined by two former students, who will be responsible for future editions. To emphasize that the book is written particularly for veterinary students, especially those in the earlier parts of their pathology course, the title has been expanded to "Principles of Veterinary Pathology", but there is naturally considerable information about special and systematic pathology.

The contents are in four parts. Part I, of just over 20 pages, comprises an introduction, and a chapter on the history of pathology. Part II, of about 80 pages, is concerned with the extrinsic and intrinsic causes of disease. This Part and the next, which

deals with general pathology in rather more than 200 pages, together form a good general account of the subject. The chapters on neoplasms and on nutritional causes of disease are especially worthy of mention. Part IV, on the "Special pathology of the systems", occupies nearly 400 pages. In an appendix of 5 pages, the techniques of post-mortem examination are described, and an account given of post-mortem changes. There follows a rather incomplete index of 15 pages.

There are about 300 illustrations, of which nearly a third are photomicrographs (a few of these are of inferior quality). The number of illustrations could be increased with advantage, with particular emphasis on macroscopic appearances. There are 4 coloured plates, for none of which is the use of colour really necessary. Some useful drawings and diagrams, e.g. some showing the distribution of different kinds of lung lesions, are provided. There are lists of references at the end of 11 of the 22 chapters—it is not clear why some at least of the others are not similarly provided.

The authors have not made their difficult task any easier by including the pathology of specific diseases with systematic pathology, and in future editions these aspects of veterinary pathology could well be separated. Although there is occasionally some over-emphatic writing, and there are occasional obscurities of meaning, on the whole the various subjects are dealt with clearly and concisely (although it is rather hard to see why a whole page is devoted to what is called "lumpy skin disease of pigs", while the same amount of space has to serve for bovine pyelonephritis). An attractive feature of the chapters on systematic pathology is an introductory discussion of functional correlations of pathological changes.

There appears to be some doubt in the authors' minds as to which is the largest organ of the body (liver, p. 492; skin, p. 666), there are some surprising misprints (including that well-known trap "pruritis" (*sic*) p. 607), and Percival Pott masquerades under another surname, but mis-statements of fact are few.

The book is well-produced, and its price is reasonable. It will have a particular appeal as a well-written, not too formidable-looking, but quite detailed, textbook for students. Although not of encyclopaedic pretensions, it would also serve as a useful reference book for the practitioner. While it was the responsibility of the senior author, this book improved

steadily and greatly over successive editions, and on such a foundation it is to be expected that it will go from strength to strength under new authorship.—E. COTCHIN.

Jacquot, R., le Bars, H., Leroy, A. M. & Simonnet, H. (1961). Nutrition animale. Biologie, physiologie et alimentation rationnelle. Volume II. Données générales sur la nutrition et l'alimentation (suite). Tome II. Métabolismes et transits. [Animal nutrition. Volume II, Part II. General principles of metabolism.] pp. 965-1430. Paris: Baillière et fils. NF 45. 3828

Part I of volume two appeared in 1960 [V.B. 30, 3121]. This second part starts with the continuation of the fifth chapter, from the previous part, dealing with the transit and metabolism of water and minerals. The sixth chapter is on the metabolism of vitamins and antibiotics. The vitamins are discussed under three main headings: forms and states in which they occur in the body; metabolic role; and functional role. In regard to antibiotics the aspects considered are: their mode of action, their use as factors enhancing food utilization; dangers; and limitations. The seventh chapter deals with energy metabolism from all the different angles. This paper-backed book is well written, with references incorporated in the text.—T.E.G.R.

Anon. (1961). *Poultry diseases under modern management*. pp. vii + 162. London: Iliffe Books Ltd. 13s. 6d. 3829

This book is based on a series of articles, written for "Poultry World" by their Veterinary Adviser and is intended to help poultry keepers when confronted with a disease problem. The emphasis throughout is on the recognition of the clinical signs of diseases and their prevention and control. The relative importance of the various diseases is discussed and brief details of post-mortem findings and laboratory diagnostic procedures are given.

Unlike many books written for the layman on veterinary subjects, this one does not encourage the reader to be his own veterinary surgeon, but stresses the need of veterinary advice and laboratory diagnosis in the control of disease.

All the common diseases are dealt with and the book is difficult to fault. The reviewer, however, considers that "Pullorum Disease" is a better name for *Salmonella pullorum* infection than "Bacillary White

Diarrhoea". The latter is a misnomer and this would have been a good opportunity to encourage the use of a more accurate name. It is unfortunate that *Pasteurella pseudotuberculosis* infection is omitted as this disease is sometimes encountered in Great Britain, particularly in turkeys. Although *Moraxella* infection in ducks is uncommon it could also have been included, especially as there is a paragraph on favus which is less frequently seen. A chapter on the so-called "X" disease of turkeys, ducks and pheasants which is associated with the feeding of groundnut meal would have brought the book completely up to date, although it is possible that insufficient information was available at the time of going to press.

It is a pity that the author has remained anonymous, especially as this is a well written book which can be thoroughly recommended, not only to poultry keepers, but also to veterinary students and veterinary surgeons in practice who have no specialized knowledge of poultry disease.—I. F. KEYMER.

Marshall, A. J. [Edited by.] (1960 & 1961). **Biology and comparative physiology of birds. Volumes I & II.** Vol. I pp. xii+518; Vol. II pp. x+468. New York (& London): Academic Press. \$14.00 & \$13.00. 3830

The editor is justified in not apologizing for the production of yet another book on birds, because with the help of several well known biologists in various parts of the world, he has amassed a considerable amount of information on ornithology, which was widely scattered in scientific journals all over the globe.

Although the work is designed for ornithologists and general biologists, no veterinary surgeon with a serious interest in avian biology can afford to ignore it, because in these two volumes there is undoubtedly collected more information on avian physiology and anatomy, including some histology, than ever before, the title of "Comparative Physiology" being rather misleading. A more accurate title for example, would be "A Manual of Ornithology". The subject matter could be rearranged so that volume I was subtitled "Biology of Birds" and volume II "Comparative Anatomy and Physiology".

In a work of this nature it is almost impossible not to omit or neglect some aspects of the subject, and the editor in his preface appreciates this fact and does not claim to have completely covered all branches of ornithology.

In fact he has purposely omitted much information on physiology and the avian egg, which has been adequately dealt with elsewhere. Nevertheless, a chapter on the general characteristics of eggs and one on nests and nest building would enhance the value of the work. It is surprising that the topography of the bird has been omitted and there is little information on the functions of plumage colorations. The veterinary reader may also be a little disappointed that no veterinary surgeon has contributed to these volumes and will probably notice the paucity of references to the veterinary literature. One or two well known works on veterinary anatomy receive no mention at all and numerous references to diseases of wild birds have also been overlooked. There are, however, excellent chapters on the comparative anatomy and physiology of all the systems and organs of the body, with the unfortunate exception of the spleen. The chapters on the integumentary, respiratory, digestive, endocrine and central nervous systems are particularly good, and so is that on musculature, although the nomenclature used in the latter is unfortunately different from that normally used in veterinary science.

In spite of the fact that there are twenty-four contributors, the style is remarkably uniform and there is surprisingly little overlap of subject matter. Most chapters can be read and assimilated without the superhuman effort that is often required to read many textbooks and reviewing these volumes was an absorbing and enjoyable experience, although it was peppered with minor frustrations in some chapters, owing to the practice of referring to most species of birds by only their scientific names. As there are probably very few ornithologists who are acquainted with the scientific names of all the birds dealt with in the text, it would be a great help if in the next edition an index is provided of the species mentioned, giving their vernacular as well as scientific name.

Both volumes are beautifully produced and bound, the print is clear and readable, the illustrations are good throughout and each chapter is followed by a valuable list of references, many of which have remained buried until now in the literary graveyards of the last century. Printing errors are hard to find, but one obvious mistake is the caption to figure 22 in chapter xvii which illustrates the effect of injections of androgenic hormone on the comb and wattles of capons; "left" should

read "right" and *vice versa*.

In spite of these criticisms, however, this is an excellent publication which is undoubtedly one of the most valuable reviews of ornithological literature that has ever been compiled.—I. F. KEYMER.

Ershov, V. S. [Edited by.] (1960). **Parasitology and parasitic diseases of livestock.** pp. 523. Jerusalem: The Israel Program for Scientific Translations [for the National Science Foundation, Washington, D.C., and the Department of Agriculture, U.S.A.] 90s. 3831

This is a translation into English of a Russian text edited by V. S. Ershov with the collaboration of D. N. Antipin, V. A. Solyaev & N. A. Zolotarev and published in 1956. The book is designed primarily for students.

The book is essentially concerned only with those parasites of livestock which occur in the U.S.S.R., and there are some apparent omissions. There is, for example no reference to *Histomonas*, *Hexamita* or *Giardia* among Protozoa and the only species of *Trichomonas* to which reference is made is *Tr. foetus*. Toxoplasmosis is dismissed in a little over one page with the comment that it "has not been sufficiently studied".

Among helminths *Ostertagia* is a notable omission and there is practically no reference to *Nematodirus*. As might have been expected from the editor's association with Skryabin in the U.S.S.R. the sections on helminth morphology are nevertheless among the most useful as are in general those which deal with clinical disease.

In the useful general introduction consideration of the parasitic way of life leads inevitably to a realization of the necessity for a well adjusted balance between host and parasite. It is surprising therefore, to find that control measures are so often envisaged as involving "sanitation" (the freeing of animals from all parasites), the breeding of healthy animals "free" from parasites and (presumably) their subsequent maintenance under conditions where infection is excluded.

In the realms of chemotherapy the book is unsatisfactory and while recognizing that it was

written at least five and probably more years ago it is nevertheless more than surprising to find that the authors have "not found any chemotherapeutic preparations which act specifically on coccidia, but several medications nevertheless act on the multiplication process of the parasites" and to find that creolin, phenothiazine and iodine are recommended for control of the disease.

In so far as this reviewer is able to judge the translators have done their work well. The use of a double system of page enumeration is irritating and one would think unnecessary. The illustrations have probably suffered severely in reproduction. There is no bibliography.

This book is worth reading but can hardly stand as a modern text-book for students.

—S. B. KENDALL.

Fraser, A. & Stamp, J. T. (1961). **Sheep husbandry and diseases.** pp. xii + 459. London: Crosby Lockwood & Son, Ltd. 4th Edit. 35s. 3832

This book is devoted to the World's sheep trade, breeds and breeding of sheep, and husbandry. All who are familiar with the works of Allan Fraser will expect to find pleasant reading which contains many facts and ideas which are of value—and they will not be disappointed. Farmers who are actively concerned with sheep breeding would do well to read Fraser on the importance of selecting by genotype, though some ram breeders might not be so pleased. Arguments against the pedigree (not the pure bred sheep) are beautifully presented.

The chapters on sheep husbandry are readable and worthwhile, and probably are as good as any collection of shepherds' beliefs yet published. Recent advances by scientists in this field have been kept to a minimum, and one has the feeling that this is because there have been no advances worth recording.

Sheep diseases are dealt with as much as possible under symptoms associated with the groups of diseases. This seems to be much the most logical method and has been handled well; for farmers, it is adequate and very useful.—G. B. S. HEATH.

BOOKS RECEIVED

[Notice of recently received books in this list does not preclude review]

Bonadonna, T. (1961). *Viaggio "zootecnico" intorno al mondo in Asia e nelle Americhe. [Report on a tour to study animal husbandry in Asia and the Americas.]* pp. xvi+311. Milan: Edizione "Progresso Zootecnico".

Butler, E. J. & Bisby, G. R. Revised by Vasudeva, R. S. (1960). *The fungi of India.* pp. xi+552. New Delhi: Indian Council of Agricultural Research. Rupees 45.50.

Levine, N. D. (1961). *Protozoan parasites of domestic animals and of man.* pp. ii+412. Minneapolis, Minn.: Burgess Publishing Company. \$6.50.

Lajtha, L. G. (1961). *The use of isotopes in haematology.* pp. x+83. Oxford: Blackwell Scientific Publications. 21s.

Thorpe, W. H. & Zangwill, O. L. [Edited by] (1961). *Current problems in animal behaviour.* pp. xiv+424. Cambridge: University Press. 45s.

Garner, R. J. (1961). *Veterinary toxicology.* pp. 447. London: Baillière, Tindall & Cox. 2nd Edit. 35s.

King, J. O. L. (1961). *Veterinary dietetics: a manual of nutrition in relation to disease in animals.* pp. ix+230. London: Baillière, Tindall & Cox. 30s.

Lucas, A. M. & Jamroz, C. (1961). *Atlas of avian hematology.* pp. vi+271. Washington, D.C.: United States Department of Agriculture. [Agriculture Monograph 25]. \$4.00.

Rothschild (1961). *A classification of living animals.* pp. vii+106. London: Longmans, Green & Co. 25s.

Wolstenholme, G. E. W. & O'Connor, M. [Edited by] (1961). *Ciba Foundation symposium on somatic stability in the newly born.* pp. xii+393. London: J. & A. Churchill Ltd. 50s.

ERRATA

V.B. 31, abst. 1141. Lissot, M. G. should read Lissot, G.
 abst. 2963. Line 3 of title. For J. Dairy Sci. 28, read
 Science 133,
 abst. 3438. The author of this work is F. Paredis, not
 M. Vandeplassche.



Effective care for the ketotic cow

DELTACORTIL INTRAMUSCULAR Bovine ketosis responds rapidly to an intramuscular injection of Deltacortril. Treated cows show a sustained recovery, appetite quickly improves and milk output is restored to normal in 4-5 days.

Availability: Vials of 10 ml. Deltacortril containing 100 mg. prednisolone.

Dosage: The normal dose is 10 ml. by intramuscular injection.

Deltacortril* Intramuscular Veterinary
brand of prednisolone



PFIZER LIMITED · SANDWICH · KENT

*Trade Mark

VETERINARY INSURANCE SERVICES LIMITED

Directors

M. D. BERWYN-JONES, M.R.C.V.S.
A. C. S. EAGLES
R. J. HURST, F.C.I.B.

TAX FREE PENSION PROVISION

The Company's unique Veterinary Surgeon's Pension provides a tax-free income from age 65 or date of death, whichever is earlier until the 85th birthday. Thereafter, an annuity is payable so long as either the Veterinary Surgeon or his wife shall survive.

As in all V.I.S. contracts, waiver of premium benefit is available. This allows for the cessation of premiums in the event of disablement by sickness or accident for a period in excess of six months.

If you would like particulars, please complete and post the enquiry slip below.

To: THE VETERINARY INSURANCE SERVICES LTD.
131-133, New London Road, Chelmsford, Essex.

Please let me have details of:

THE VETERINARY SURGEON'S PENSION POLICY

Name

Address

..... Tel. No.

Date of Birth Wife's date of Birth

The V.I.S. transacts all classes of insurances including the
**VETERINARY SURGEON'S PERSONAL AND
FAMILY POLICIES
SCHOLASTIC PLAN
SURGERY COMPREHENSIVE POLICY**

If you wish information regarding these or any other types of insurance please indicate here

CONTENTS

	<i>Page</i>
Diseases caused by Bacteria and Fungi	687
Diseases caused by Protozoan Parasites	701
Diseases caused by Viruses and Rickettsia	705
Immunity	713
Parasites in Relation to Disease [Arthropods]	714
Parasites in Relation to Disease [Helminths]	717
Spontaneous and Transmissible Neoplasms and Leukaemias [Including Fowl Paralysis]	722
Nutritional and Metabolic Disorders	723
Diseases, General	727
Poisons and Poisoning	730
Pharmacology and General Therapeutics	734
Physiology, Anatomy and Biochemistry	736
Livestock Hygiene	743
Reproduction and Reproductive Disorders	744
Zootechny	747
Technique and Apparatus	747
Reports	748
Book Reviews	750
Books Received	751

INDEX TO AUTHORS

Abbott, U. K., 4149.
 Abdel-Raouf, M., 4174.
 Ablett, R. E., 3971.
 Abplanalp, H., 4149.
 Abrams, J. T., 4083.
 Abreu Lopes, J. A., 3842.
 Adinayaranan, N., 3866.
 Adler, H. E., 3917.
 Adler, J. H., 4121.
 Al-Dabagh, M. A., 3932, 3933.
 Alibasoglu, M., 4050.
 Alicata, J. E., 4034.
 Alcroft, R., 4113.
 van Allen, A., 3977.
 Allen, M. R., 4128.
 Allen, R. W., 4042.
 Almejew, C., 4085.
 Amerault, T. E., 3880.
 Andersen, E. H., 4010.
 Anderson, G. W., 3903.
 Anderson, J. L., 4006.
 Andersson, N. S. E., 4134.
 Andrade dos Santos, J., 4090.
 Andreev, K. P., 4011.
 Andrews, H. L., 4102.
 Archer, R. K., 4135.
 Arthur, B. W., 4046.
 Arvy, L., 4184.
 Ash, L. R., 4020.
 Assimacopoulos, C., 4050.
 Axford, R. F. E., 4120.
 Aycardi, J., 3927.

Bachrach, D., 4153.
 Backhouse, T. C., 4091.
 Bailey, C. B., 4093.
 Bailey, W. S., 4036.
 Baker, L. A., 3971.
 Bankowski, R. A., 3981.
 Baradnay, G., 4153.
 Barnes, F. D., 3973.
 Baron, S., 3992.
 Barreira, F., 4104.
 Bartels, H., 4218.
 Baruh, H. K., 3902.
 Bastarrachea, F., 3850.
 Bateman, N., 4014.
 Bauch, R. J., 4009.
 Bauer, D. I., 3976.
 Beard, D. C., 4196.
 Bedryńska-Dobek, M., 3911.
 Beilharz, R. G., 4139.
 Bell, M. C., 4078.
 Benson, W. W., 3998.
 Beraldo, W. T., 4051.
 Berman, S., 3955.
 Berousek, E. R., 4185.
 Betts, A. O., 3969.
 Bezeau, L. M., 4093.
 Bhattacharjee, D. S., 4146.
 Bica-Popli, V., 3862.
 Biegeleisen, J. Z., Jr., 3881.
 Biggs, P. M., 4001.
 Bilbey, D. L. J., 4195.
 Birch-Andersen, A., 4188.
 Bisby, G. R., 4215.
 Bishop, D. W., 4002.
 Bishop, J. A., 4094.
 Bittle, J. L., 3970.
 Blair, J. E., 3829.
 Blaxter, K. L., 4077.
 Bildaru, T., 4058.
 Blom, E., 4188.
 Blommer, E., 3838.
 Blum, A. S., 4161.
 Bögel, K., 3960.
 Börger, K., 3878.
 Bojalil, F. F., 3850.
 Bolliger, A., 4091.
 Bollwahn, W., 4096.
 Bonadonna, T., 4221.
 Booth, N. H., 4133.
 Bouvier, C., 3951.
 Bowen, H. J. M., 4208.
 Braco-Forte, M. da C., Jr., 3842.
 Bray, R. S., 3939.
 Bremner, K. C., 4040.
 Bressou, C., 4217.
 Briant, A. K., 4214.
 Bridge, P. S., 4083.
 Briggs, M., 3996.
 Britz, W. E., Jr., 4203.
 Brochart, M., 4157.
 Brocklesby, D. W., 3938.
 Brotherton, J. G., 3861.
 Broustail, M., 4220.
 Brown, F., 3942.

Brown, M. L., 4055.
 Brown, W. A. B., 4064.
 Brunson, J. G., 3870.
 Buescher, E. L., 3979.
 Bull, L. B., 4127.
 Buntain, D., 4112.
 Burden, E. H. W. J., 4111.
 Burdin, M. L., 4072.
 Burger, R. E., 4189.
 Burns, K. N., 4113.
 Buryabash, F. N., 4052.
 Buschmann, H., 4159.
 Butler, E. J., 4215.

Cameron, G. R., 4100.
 Campbell, R. M., 4168.
 Campbell, W. C., 4032.
 Canella, C. F. C., 4124, 4125, 4126.
 Carithers, R. W., 4055.
 Carlson, R. H., 4133.
 Carmichael, L. E., 3973.
 Carnaghan, R. B. A., 3990, 4118.
 Casals, J., 3953.
 Casey, M., 3998.
 Du Casse, F. B. W., 3852.
 Catley, A., 4006.
 Cavanagh, J. B., 4132.
 Cawse, P. A., 4208.
 Ch'ang, T. S., 4194.
 Charnot, Y., 4152.
 Cherry, W. B., 3836.
 Chodkowski, A., 3882.
 Chow, T. L., 3959.
 Clapham, P. A., 4038.
 Clark, W. N., 3925.
 Clarkson, M. J., 3935.
 Clauss, A., 3847.
 Clifford, D. H., 4144.
 Codner, R. C., 3904.
 Cohen, J. O., 3836.
 Cole, R. K., 4202.
 Collins, C. H., 3859.
 Colombo, S., 4106.
 Conge, G. A., 3854.
 Connolly, J. H., 3996.
 Cook, J. E., 4203.
 Copp, D. H., 4182.
 Cornelius, C. E., 4094.
 Cottew, G. S., 3913.
 Cowan, J. R., 4100.
 Cowart, G. I. McT., 4204.
 Cowie, A. T., 4158.
 Crabb, W. E., 3918.
 Crabo, B., 4173, 4174.
 Crispens, C. G., Jr., 4061.
 Crosfill, M. L., 4171.
 Cruickshank, C. N. D., 3904.
 Csoka, R., 3888.
 Cuckler, A. C., 4031.
 Culbertson, C. G., 3948.
 Cumming, R. B., 3916.
 Cuperlovic, K., 4049.
 Cuthbertson, D. P., 4168.
 Czub, E., 4107.

Dane, D. S., 3996.
 Dargelos, R., 3940.
 David, J. E., 4117.
 Davidson, A. G. F., 4182.
 Davies, D. R., 4132.
 Dawson, F. L. M., 4200.
 Degen, L., 3865.
 Dellmann, H.-D., 4172.
 DeLong, R., 3909.
 Diaconescu, A., 3862.
 Diamond, D. L., 4036.
 Dias da Silva, W., 4051.
 Dick, G. W. A., 3996.
 Dixon, J. M. S., 3873.
 Döhreiner, J., 4124, 4125, 4126.
 Dolan, M. M., 3905.
 Donald, L. G., 4077.
 Donelly, J., 4005.
 Doran, D. J., 3929, 3930.
 Dorner, B. A., 3848.
 Douglas, S. W., 4097.
 Dow, C., 4037.
 Doxey, D. L., 4115.
 Drescher, J., 3952.
 van Drimmelen, G. C., 3883.
 Druce, C. G., 4162, 4195.
 Drudge, J. H., 4028, 4029, 4030, 4035.
 Drummond, R. O., 4007.
 Dubos, R. J., 3854.
 Dudgeon, J., 3994.

Duff, J. T., 3897.
 Dun, R. B., 4191.
 Dunne, H. W., 3891, 4050.

Egerton, J. R., 4033.
 Egyed, M., 4121.
 Elam, G., 4028, 4029, 4030, 4035.
 Elberg, S. S., 3884.
 Elek, P., 3913.
 Ellner, P. D., 3895.
 Emby, G. N., 4017.
 Emro, J. E., 4044.
 Engelbrecht, H. J., 4047.
 Erhardt, V., 4067.
 Evans, I. A., 4120.
 Evans, W. C., 4120.

Fair, J. F., 3833.
 Farleigh, E. A., 4076.
 Farr, M. M., 3929, 3930.
 Fearn, J. T., 4074.
 Fendrick, A. J., 3905.
 Ferguson, T. M., 4100.
 Ferrando, R., 4169.
 Field, C. M. B., 3996.
 Filsell, O. H., 4086.
 Fineg, J., 4203.
 Flock, M. A., 3897.
 Florence, R., 4206.
 Forbes, R. M., 4078.
 Ford, E. H. R., 4064.
 Francis, J., 3851.
 Franks, D., 4135.
 Freedman, H. H., 3835.
 Fried, K., 4053.
 Froget, J., 4169.
 Freyd, G., 4021.
 Füzi, M., 3888.
 Furniss, A. L., 3859.

Gala, R., 3857.
 Gale, C., 3982.
 Gallagher, C. H., 4116.
 Gallagher, P. J., 4017.
 Gardiner, J. L., 3926.
 Gardiner, M. R., 4122.
 Garnham, P. C. C., 3939.
 Gassmann, B., 4067.
 Gazzinelli, G., 4051.
 Gerhardt, P., 3947.
 Gerriets, E., 4067.
 Gilbert, R. P., 3870.
 Gillespie, R. W. H., 3886.
 Gilman, H. L., 3890.
 Gilmour, N. J. L., 3861.
 Giolitti, G., 3877.
 Gligorijević, J., 4049.
 Good, A. L., 4144.
 Goode, E. R., Jr., 3880.
 Grace, J. T., Jr., 4004.
 Graham, I. C., 3908.
 Granett, P., 4013.
 Gray, A. R., 3921.
 Grenan, M. M., 4101.
 Grinnell, E. H., 4110.
 Grogan, E. W., 3955.
 Gründler, H.-D., 4087.
 Grütte, F.-K., 4067.
 Guest, W., 4175.
 Guia, M. M., 4051.

Habel, J. D., 4074.
 Hackbarth, J., 4123.
 Haenel, H., 4067.
 Hagen, K. W., Jr., 3901.
 Hale, W. H., 4068.
 Halstead, S. B., 3979.
 Hammond, D. M., 3925.
 Hamparian, V. V., 3961, 3962, 3963.
 Hampil, B., 3962.
 Hancock, J. L., 4190.
 Hanly, E. W., 4175.
 Hansens, E. J., 4013.
 Hanson, D. J., 4137.
 Harding, W. B., 3956.
 Harris, A. N. A., 3956, 4076.
 Harrison, I. R., 4016.
 Harvey, K. A., 3998.
 Hasson, M., 4156.
 Hatemi, N., 4069.
 Hay, A. J., 4179.
 Hay, M. F., 4176.
 Hebert, H. J., 3946.
 Hecke, F., 3968.
 Heidrich, H. J., 4092.
 Heist, C. E., 3891.
 Henneman, H. A., 4181.
 Heude, B., 4169.

Heuner, F., 3879.
 Heuschele, W. P., 3941.
 Heyneman, D., 4024.
 Hickey, J. L. S., 4063.
 Hileman, M. R., 3961, 3962, 3963.
 Hillis, W. D., 3993.
 Hinshaw, L. B., 3870.
 Hirsch, H. A., 3896.
 Hobbs, W. B., 3848.
 Hoekstra, J., 3985.
 Hoersch, T. M., 4181.
 Hofmeyr, C. F. B., 4110.
 Holland, P., 4132.
 Holmes, J. W. H., 3971.
 Honigberg, B. M., 3923.
 Horton, R. E., 4063.
 Hou, C. T., 4109.
 Howell, G. J. R., 4190.
 Horvorka, J., 4054.
 Howard, D. A., 4072.
 Howard, J. G., 3876.
 Hubbard, E. D., 4030.
 Huck, R. A., 3957.
 Huffman, M. N., 4119.
 Hulland, T. J., 4022.
 Humphrey, G. L., 3946.
 Humphreys, D. A., 4120.
 Hunter, G. L., 4193.
 Hurst, E. W., 3900.

Ikeda, S., 3966, 3967.
 Ingram, D. L., 4145.
 Ionescu, A., 4019, 4098.
 Ireland, H. R., 4008.
 Isaacs, A., 3992.
 Ito, A., 3837.
 Ivens, M. S., 3906.

James, G. A., 3838.
 Jansen, J., 3974, 3991.
 Jantosović, J., 4053.
 Jarrett, I. G., 4086.
 Jarrett, W. F. H., 3957, 4037.
 Jennings, F. W., 4037.
 Jensen, A. H., 4186.
 Jensen, M. L., 3838.
 Jitaru, G., 3909.
 Johnson, C. R., 4154.
 Johnson, J. R., 4119.
 Johnston, M. M., 3863.
 Johnston, P. B., 3980.
 Jovanović, M., 4049.

Kaemmerer, K., 4141.
 Kantor, S., 3928.
 Kaplan, H. M., 3869.
 Kaplan, W., 3906.
 Karib, E. A., 3912.
 Karsal, F., 4108.
 Kelch, F., 4218.
 Kellas, L. M., 4177.
 Kelly, D. F., 3969.
 Kennedy, K. K., 3833.
 Kennett, R. L., Jr., 3928.
 Kenzy, S. G., 3886.
 Kershaw, W. E., 4027.
 Kettler, A., 3961, 3962, 3963.
 Kilbourne, E. D., 3951.
 Kimberg, D. V., 4165.
 Kingsbury, P. A., 4045.
 Kinnaman, K. E., 4055.
 Kirshnamurti, P. V., 3934.
 Kitts, W. D., 4128.
 Knežík, J., 4054.
 Kniazeff, A. J., 3957.
 Knorpp, F., 3855.
 Knudsen, O., 4198, 4199.
 Konno, K., 3860.
 Korpássy, B., 4153.
 Kradel, D. C., 4050.
 Kraft, L. M., 3975.
 Kucharski, J., 4105.
 Kuida, H., 3870.
 Kumagal, T., 3966, 3967.
 Kurbatov, V., 4161.
 Kurtz, H. J., 4102.
 Kutas, F., 4108.

Lackman, D. B., 3998.
 Lambert, G., 3880.
 Lamont, P. H., 3969.
 Lampkin, G. H., 4072.
 Lancaster, M., 4132.
 Lane-Petter, W., 4219.
 Lank, R. B., 4041.
 Larvor, P., 4157.
 Laties, V. G., 4148.
 Lebek, G., 3846.

Author Index

Lee, H. F., 4020.
 Lee, J. H., 3886.
 Leek, R. G., 3931.
 Leibowitz, M. I., 4000.
 van Lenne, E. W., 4178.
 Lerche, M., 4218.
 Lesslie, I. W., 3844.
 Lévy, F. M., 3854.
 Levvy, G. A., 4179.
 Lewis, G., 4113.
 Liess, B., 3957.
 Lindner, H. R., 4176.
 Lindop, P. J., 4103.
 Lishman, A. W., 4193.
 Little, M. D., 4020.
 Littlejohn, A. I., 3892.
 Littlejohn, I. R., 3956, 4076.
 Litvinov, N. A., 3914.
 Live, I., 3834.
 Livingstone, R. M., 4075.
 Lober, P., 4059.
 Lockhart, C. P., 4154.
 Long, W. H., 4131.
 Lotze, J. C., 3931.
 Lowenthal, J. P., 3955.
 Lucas, I. A. M., 4075.
 Lundberg, A. M., 3880.
 Luther, H. G., 4068.

McAleese, D. M., 4078.
 McAlister, J., 3996.
 McAllan, A., 4179.
 McCabe, W. R., 3871.
 McCallum, E. S. R., 4077.
 McCance, R. A., 4064, 4069.
 McCarthy, P. H., 4130.
 McCartney, M. G., 3982.
 McClelland, L., 3962.
 McConachie, J. D., 3903.
 McCosker, P. J., 4151.
 McCune, R., 3951.
 McDonald, I., 4075.
 McDonald, M. W., 4139.
 McEntee, K., 3890.
 McFarlane, A. S., 4168.
 McFerran, J. B., 3964.
 McGibbon, W. H., 3934.
 McIntyre, W. I. M., 4037.
 McKelvie, P., 4162.
 McKeown, F., 3996.
 Mackie, W., 4168.
 McLean, J. A., 4145.
 McLean, D. M., 3978.
 Macleod, J., 4005.
 McLoughlin, D. K., 3926.
 MacPherson, L. W., 3978.
 McQueen, E. J., 3978.
 Magee, D. F., 4170.
 Maglione, E., 3849.
 Männsson, G., 4057.
 Mahoney, G. W. A., 4185.
 Malek, E. A., 4020.
 Mandoul, R., 3940.
 Mann, I., 4205.
 Mann, T., 4176.
 Mansior, M., 3986.
 Måansson, I., 3899.
 Måansson, J., 4197.
 Manthel, C. A., 3880.
 Marazza, V., 4106.
 Marks, J., 3859.
 Marshall, P. G., 4016.
 Marthedal, H. E., 4099.
 Martinaglia, G., 3848.
 Mašić, M., 3944, 3945.
 Mast, C., 3895.
 Mather, H. D., 3997.
 Mather, J., 3998.
 Matumoto, M., 3966, 3967.
 Maumenee, A. E., 4000.
 Mauss, H., 3854.
 Marhew, R. L., 4041.
 Mendes, J. A., 4104.
 Metzcar, R. S., 4004.
 Miksch, E. D., 4203.
 Millan, J., 3940.
 Miner, M. L., 3838, 3925.
 Mitsuhashi, S., 3875.
 Miura, S., 3837.
 Miyamae, T., 3837.
 Monlux, W. S., 4060.
 Montalvo, G., 4154.
 Moody, M. D., 3881.
 Morris, B., 3874.
 Morrison, S. M., 3833.
 Moss, W. G., 4161.
 Moulton, J. E., 3941.
 Movsesian, M., 4049.

Muehling, A. J., 4186.
 Müller, J., 3898.
 Müller-Beuthow, W., 4067.
 Mulligan, W., 4037.
 Mullins, A. M., 4131.
 Munday, B. L., 4073.
 Murgu, I., 4058.

Naaktgeboren, C., 4150.
 Nadakal, A. M., 4026.
 Nagayama, H., 3860.
 Nakagawa, M., 3837.
 Nakamura, M., 3924.
 Nathan, P. W., 4142.
 Nelson, G. L., 4185.
 Nelson, R., 3996.
 Nevenic, V., 4049.
 Neves, A. G. A., 4051.
 Neves, E. M., 4104.
 Newberne, J. W., 3970.
 Newsom, L. D., 4131.
 Newton, W. M., 4088.
 Nicander, L., 4174.
 Nichols, A. C., 3884.
 Nicol, T., 4162, 4195.
 Niemoller, H., 4156.
 Nigg, C., 3863.
 Nistor, T., 4019.
 Noffsinger, J., 4119.
 Norberg, I., 4197.
 Nordan, H. O., 4204.
 Nordin, B. E. C., 4081.
 Nowak, H. F., 4105.

Oberdorfer, A., 3846.
 O'Halloran, M. W., 4073.
 Oka, S., 3860.
 Olson, N. O., 4138.
 Olsson, B., 3899.
 Ormerod, W. E., 3922.
 Ortymayer, H., 3917.
 O'Sullivan, J. G., 3907.

Paine, T. F., Jr., 3896.
 Palacios Remondo, J., 4095.
 Palludan, B., 4084.
 Palmer, A. C., 4083, 4097.
 Pandit, C. N., 4025.
 Parks, J. J., 4000.
 Parnas, J., 3882.
 Pascoe, R. R., 3840.
 Pascu, T., 4019.
 Pasquier, J. F., 3854.
 Pauling, L., 4143.
 Payne, N. N., 4001.
 Peardon, D. L., 3934.
 Penfold, T. W., 3853.
 Penny, R. H. C., 4117.
 Petek, M., 3898.
 Petrović, K., 4043.
 Petrović, M., 3945.
 Petrović, Z., 4043.
 Philip, J. R., 3868, 3937.
 Phillips, G. D., 4164.
 Phillips, J. E., 3910.
 Phillipson, A. T., 4168.
 Phillipson, R. F., 4027.
 Planterose, D. N., 3942.
 Plessing, H., 4067.
 Plommet, M., 3841.
 Poenaru, I., 3909.
 Polyanskiy, M. V., 4023.
 Ponomarenko, V. A., 4056.
 Porterfield, J. S., 3954.
 Potash, L., 3962.
 Potel, J., 3865.
 Powell, H. M., 3948, 3995.
 Powelson, D. M., 3915.
 Powers, T. E., 4136.
 Pritchard, W. R., 3957.
 Pross, F., 4066.
 Pudles, J., 4051.
 Pullar, E. M., 4207.

Quaglio, G., 3989.

Răduănescu, H., 3909.
 Raettig, H., 4003.
 Ragni, M., 3849.
 Ralston, D. J., 3884.
 Ramsey, F. C., 3957.
 Rawes, D. A., 4038.
 Read, J., 3984.
 Redaelli, G., 3877.
 Reich, C. V., 3891.
 Reineke, E. P., 4181.
 van Rensburg, S. J., 3852.
 Ressang, A. A., 3987.

Restall, B. J., 4191.
 Reuss, U., 3893.
 Reynolds, W. M., 4068.
 Rhone, J. R., 4119.
 Rich, G. B., 4008.
 Ridgon, R. H., 4100.
 Ring, G. C., 4161.
 Riser, W. H., 4080.
 Roberts, C. W., 4180.
 Robson, J., 3920.
 Rodda, G. M. J., 3845.
 Ronald, K., 3978.
 Rose, J. H., 4048.
 Rosenberg, J. C., 4059.
 Rosenberg, S. A., 4059.
 Ross, C. A. C., 3965.
 Rothblat, J., 4103.
 Rothe, W. E., 4101.
 Rothestein, N., 4055.
 Rozansky, R., 3885.
 Rubini, M. E., 4154.
 Ryle, M., 4201.

Sadler, P. W., 3976.
 Saincivlier, M., 3841.
 Sälägeanu, G., 3856, 4098.
 Samson, K. S., 4042.
 Samuel, J. McA., 3861.
 Sanger, V. L., 3982.
 Santiago Luque, J. M., 4095.
 Sargeant, K., 4118.
 Sato, G., 3837.
 Sato, I., 3875.
 Sato, M., 4180.
 Schachter, D., 4165.
 Schaeffer, R. W., 3854.
 Schaefer, K. E., 4156.
 Schable, P. J., 4070.
 Schenker, H., 4165.
 Schipper, I. A., 3957.
 Schmid, D. O., 4159.
 Scholten, T. H., 3978.
 Schulman, J., 3951.
 Schwöbel, W., 3943.
 Scott, G. R., 3972.
 Sears, T. A., 4142.
 Seifert, H., 3843.
 Sellers, T. F., Jr., 3951.
 Setchell, B. P., 4076.
 Shah, H. L., 4025.
 Sharman, G. A. M., 4077.
 Sharman, I. M. A., 4083.
 Sharp, D. G., 3950.
 Sheffy, B. E., 3969.
 Shelley, W. B., 4206.
 Shelton, D. C., 4188.
 Sheridan, B. W., 3941.
 Sherman, W. C., 4068.
 Shevtsova, N. I., 4163.
 Shiffrine, M., 3917.
 Shimizu, H., 4180.
 Shimizu, T., 3966, 3967.
 Shively, J. N., 4102.
 Shoffner, R. N., 4189.
 Shone, D. K., 3868, 3936, 3937.
 Siegel, H., 3857, 3858.
 Silverman, P. H., 4022.
 Simkiss, K., 4155.
 Simpson, R. M., 3972.
 Sinclair, A. N., 4015.
 Singer, E., 3845.
 Singh, S. B., 3866.
 Skerman, K. D., 4073.
 Sleight, S. D., 3880.
 Slen, S. B., 4093.
 Smith, H., 4082.
 Smith, H. Williams, 3918.
 Smith, I. D., 4147.
 Smith, J., 4018.
 Smith, K. O., 3950.
 Smith, R. H., 4079.
 Smith, W., 4161.
 Smith, W. W., 3838.
 Smythe, R. H., 4216.
 Soave, O. A., 3977.
 Soeratno, 3872.
 Sofrenović, D., 4049.
 Sokollić, A., 4049.
 Solnitchi, A., 4098.
 Solotorovsky, M., 3857, 3858.
 Srivatling, F. R., 4083.
 Squibb, R. L., 3857, 3858.
 Stānicā, L., 3899.
 Stenhen, J., 3894.
 Stewart, D. L., 3942.
 Stoerher, M., 3957.
 Stoennner, H. G., 3998.

Storry, J. E., 4065, 4166, 4167.
 Stowe, C. M., Jr., 4144.
 Sturkie, P. D., 4160.
 Sudsaneh, S., 4168.
 Sultzeanu, D., 3885.
 Sultzter, B. M., 3835.
 Sutmöller, P., 4071.
 Swarbrick, O., 4129.
 Swenson, M. J., 4133.
 Szabó, E. B., 4153.

Takeuchi, S., 4180.
 Tanaka, T., 3875.
 Taneja, G. C., 4146.
 Taylor, G. C., 3881.
 Taylor, J. H., 4082.
 Textor, K., 4160.
 Thiéry, G., 3949.
 Thomas, A. J., 4120.
 Thompson, R. H., 4114.
 Thomson, A., 3893.
 Threlfall, G., 4120.
 Tillotson, A., 4119.
 Timmerman, J. A. Jr., 4046.
 Tindal, J. S., 4158.
 Todd, A. C., 3934.
 Todd, J. R., 4114.
 Tokarnia, C. H., 4000, 4124, 4125, 4126.
 Trapp, A. L., 3958.
 Travis, H. F., 4070.
 Trotter, M. D., 3904.
 Turner, H. F., 4046.
 Turner, L. W., 3887.

Varachiu, N., 3856, 4019, 4098.
 Vasudeva, R. S., 4215.
 Vaughan, J. B., 3947.
 Velling, G., 4099.
 Vidler, B. O., 3938.
 Vissac, B., 4157.
 Visscher, M. B., 3870.
 Vlăduțiu, O., 4058.
 Vujic, B., 4043.

Wagner, W. C., 3890.
 Walcher, D. N., 3995.
 Wales, R. G., 4187.
 Waletzky, E., 4044.
 Walker, D. F., 4036.
 Walker, D. J., 4076.
 Waller, S. J. A., 3978.
 Ward, A. J. Jr., 3853.
 Ward, G. M., 4133.
 Warner, A. R., Jr., 4102.
 Washendorfer, G., 3988.
 Washko, F. V., 3963.
 Watson, R. H., 4192.
 Watt, J. G., 4115.
 Weiss, B., 4148.
 Welch, R. M., 4175.
 Wells, G. E., 3936.
 Wemmenhove, R., 3974.
 Westpfahl, U., 4183.
 Wheater, D. W. F., 3900.
 White, G., 3972.
 White, I. G., 4187.
 White, L. E., Jr., 3853.
 Whittow, G. C., 4145.
 Widdicombe, J. G., 4171.
 Wilkins, J. H., 4140.
 Willett, K. C., 3919.
 Williams, R. E. O., 3839.
 Wilson, R. S., 4077.
 Wilson, W. O., 4149.
 Winsser, J., 3867.
 Wittmann, G., 3997.
 Wölk, B., 4003.
 Wogan, G. N., 3857, 3858.
 Wood, A. J., 4204.
 Wood, I. B., 4044.
 Wood, S. R., 3904.
 Woodward, K. T., 4102.
 Wright, A. I., 4117.
 Wright, M. L., 3903.
 Wyant, Z. N., 4029, 4030.
 Wyllie, J. C., 3978.

Yarinsky, A., 3897.
 York, C. J., 3970.

Zakamyrdin, I. A., 4011, 4012.
 Zebrowski, L., 3950.
 Zhuravlev, V. V., 3864.
 Zimmermann, B., 4059.
 Zimmermann, W. J., 4039.
 Zuschek, F., 3959.
 Zwilleberg, H. H. L., 4150.

on-the-spot
antibiotic
therapy



INTRAMYCETIN* is particularly well-suited for on-the-spot field therapy as well as surgery use. INTRAMYCETIN needs no premixing, is readily taken into the syringe, well tolerated and quickly produces high antibiotic blood levels.

INTRAMYCETIN

an aqueous 15% suspension of CHLOROMYCETIN*

for intramuscular use in cattle and pig Scours, Metritis in sheep and Gastro-enteritis in horses.

Available in vials of 10 ml. and 30 ml. containing respectively the equivalent chloramphenicol of 1½ g. and 4½ g.

*TRADE MARK



PARKE-DAVIS

WPS-1122

PARKE, DAVIS & COMPANY Inc. USA Liability Limited
Hounslow, Middlesex. Tel: HOUNslow 2361